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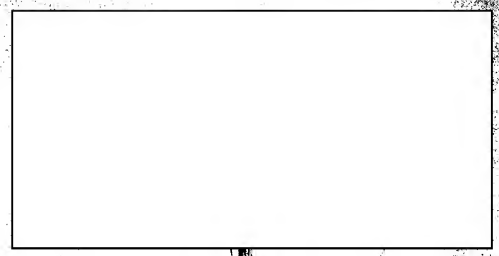

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IV

URGENT NECESSITY FOR IMMEDIATELY

INCREASING CHINESE COAL PRODUCTION

TO PREVENT ECONOMIC COLLAPSE

SUMMARY OF FINDINGS AND CONCLUSION

FINDINGS

Prewar Production (1937)	32,000,000 tons per year
Present Production (first half 1947 basis)	23,000,000 tons per year
Deficity Against Prewar	9,000,000 tons per year
1942-3 Wartime Production (incl. Manchuria and Taiwan)	72,000,000 tons per year
China's Coal Reserves	241,634 Million tons
Number of mines included in this proposal	8
Anticipated Production of Restored Mines	12,300,000 tons per year
Estimated Cost of Rehabilitation of Restored Mines	$19,023,815 (U.S.)
Amount of Loan Requested	$17,500,000
Amortizing Period of Loan	25 years
Interest Rate	2-1/2 %
Yearly Amortizing Charge	$ 950,250
Amortizing Charge based on Production	$ .08 per ton
Coal Exports can Supply Foreign Exchange	

GENERAL OBSERVATIONS:

The most essential element in the industrial life on any nation is an adequate supply of coal both for its industries and for the well-being of its people.

China used to produce 32 million tons of coal in 1937 when she had not yet entered the war with Japan. Of this amount about 12 million were produced from the Northeastern Region (Manchuria), 11 million from the Northern Provinces, and 9 million from the rest. During the war in the years 1942-3, it was estimated by the Foreign Economic Administration of U. S. Government that the annual production of coal for all of China, including Northeastern Region and Taiwan, was 72 million tons.

China is suffering today from a serious shortage of coal. Its mines are currently able to produce at the rate of 23 million tons per year or less than one-third of the tonnage produced in 1943.

This deficit is having a serious effect on China's present economy, coal being the main source of energy for its many small and widely scattered industries.

This coal shortage also contributed to the distress, unrest and sickness of the people, especially in the larger cities where fuel is required for heating and maintenance of essential services.

Finally the shortage of coal in China prevents any substantial coal export upon which Japan and other Far Eastern countries are dependent for commercial revival.

The cause of this shortage is primarily due to the condition of the mines as a result of the war and its aftermath. A survey to determine these conditions and the requirements for speedy rehabilitation was made in 1946 by leading American mining engineers of the firm of Pierce Management, Scranton, Pennsylvania. Their survey shows that the liberated mines in China have suffered chiefly because of looting.

malicious destruction, flooding, and disruption of power and railroad facilities.

All of the mines suffer from deferred maintenance due to lack of equipment and materials, misapplication of machinery, lack of operating supplies and bad wartime mining practice.

Much of the Japanese productive capacity cannot be restored as it was obtained from outcrop openings by crude methods and the use of forced labor. The age of such openings and the destruction subsequent to surrender has eliminated these tonnage possibilities.

LOCATION OF CHINA'S RESOURCES:

China is plentifully supplied with coal reserves which can be developed to meet any requirements.

These reserves, classified in million of metric tons, are:

Total Reserves of Coking Coal	2,728
Total Reserves of Anthracite Coal	46,001
Total Reserves of Bituminous Steam Coal	188,167
Total Reserves of Lignite	4,738
GRAND TOTAL PROVEN RESERVES	241,634 Million metric tons

China ranks fourth in coal resources among the nations of the world.

At China's previous maximum production, these reserves would last for 3,500 years.

The distribution of these reserves by provinces is shown on Table I in the Appendix of this report.

CONSUMER REQUIREMENTS:

The previous and current coal consumption for different purposed is shown in the following table:

DISTRIBUTION OF PREWAR, WARTIME AND CURRENT COAL CONSUMPTION IN CHINA BY TYPE OF USE

Supply	1934-35	Est. 1943	Est. 1946-47
Production	32,600	72,000	23,000
Imports	1,038	0	(very small)
Total Supply	33,638	72,000	23,000
Exports	3,800	3,400	0
Available Supply	29,838	68,600	23,000
Type of Use			
Railroads	3,210	12,000	4,600
Mines and smelters	3,200	12,000	1,200
Household and small industry	11,500	15,000	9,200
Large mfg. establishments	7,200	10,500	b/
Electric power	a/	4,500	3,500
Military		6,000	
Bunkering	1,964	3,000	1,000
Residual c/	2,764	5,600	3,500
Total Consumption	29,838	68,600	23,000

As noted in the foregoing, the current rate of production in the last half of 1946 to the first part of 1947 amounted to only twenty-three million tons per year.

Even with the elimination of all export coal, the amount available for consumption is less than one-third of 1943 production.

As pointed out in our general observations, the effect of this on railroads, electric power plants, household and small industries is having a serious effect on China's internal economy, in its effort to create employment and to stabilize currency in relation to other currencies.

As compared to a per capita consumption of coal in the United

a/ Included in "household and small industry" and "large manufacturing establishments" categories.
b/ Included in "household and small industry" and "electric power" categories.
c/ Residual for 1934-35 and 1946-47 includes military consumption/

States for industrial, power and all other uses of five tons per person, the maximum production in China provided only one-eighth of a ton per person.

There is, therefore, the necessity for promptly taking the following action:

1. Immediate rehabilitation of existing strategic mines to relieve the present coal deficiency.

2. Development of modern mines to provide for industrial development and improvement in living standards.

PRESENT PRODUCTION:

The production of coal by regions for various years and at present is shown in the following table:

PREWAR, WARTIME AND CURRENT COAL OUTPUT IN CHINA BY REGIONS*
(in 1,000 metric tons)

Region	1934-35	1943	1946-47
Manchuria	11,800	33,000	5,500
North China	16,000	26,000	11,000
Southwest China	850	7,000	2,500
Remaining areas	3,970	6,000	3,500
Total	32,620	72,000 (app.)	23,000

*Estimated figures

PIERCE RECOMMENDATION AND OUTLINE OF PRESENT PROJECT

The mines considered for immediate rehabilitation in the various areas are shown on the map by colored pencil in the Appendix of this report.

The selection of these mines takes into account their location in relation to consumer requirements according to population and transportation, as well as their future value to industrial expansion.

The mines are listed in three categories, namely, First Stage Government Mines, Second Stage Government Mines, and Private Mines.

On August 1, 1945, Pierce Management submitted a summarizing report on the material and equipment for coal mining required by the PORT PROGRAM, total cost f.o.b. American factories, $9,407,190.00, total tonnage 23,052.63 (Attachment 1). This program was not consummated due to the earlier arrival of V-J Day. The intention of getting coal production from the mines then occupied by the Japanese was, however, one of the major prerequisites for the anticipated success of American Expenditional Force. The equipment suggested is also in line with the general requirement for the rehabilitation of Chinese coal mines.

Reports on the equipment and material necessary for the rehabilitation of all Government mines were submitted by Pierce Management to the National Resources Commission of China under date of August 20, 1946. As shown on Attachment 2 the summarizing report gives the capital requirement for immediate rehabilitation of all 1st and 2nd state Government mines, total amount required was U.S. $39,749,213.00.

Detailed list of requirements were provided for several of the first stage mines (Attachment 3). These specifications cover only the material essential to correct the machinery and supply deficiency in order to obtain the necessary tonnages and maintain the property. This equipment will conform, however, to future programs of mine modernization which are required to develop these mines to full potential capacity.

In this project, it is proposed to rehabilitate and develop the following mines:

1. Northeastern China:

Fuhsin, Jehol Province — to rehabilitate from present production of 5,000 tons/day to 10,000 tons/day.

Peipiao, Jehol Province — to rehabilitate from present production of 1,000 tons/day to 3,000 tons/day

2. North China
Kailan, Hopei Province (Private ownership) — to develop from present production of 14,000 tons/day to 15,000 tons/day

Chinghsing, Hopei Province — to rehabilitate from present standstill condition to 5,000 tons/day

Chunghsing, Shantung Province (Private ownership) — to rehabilitate from present standstill condition (largely destroyed) to 1,000 tons/day

Yilo, Hunan Province — to rehabilitate from present small production to 1,000 tons/day

3. Central and South China

Kaokang (otherwise known as Kansi), Kiangsi Province — to develop from present small production to 2,500 tons/ day

Hsiangtan, (otherwise known as Chunghsiang, Hsiangkiang, etc.) Hunan Province — to develop from present 500 tons/day to 3,000 tons/day

ECONOMIC AND ENGINEERING JUSTIFICATION

The larger mines in North China and Manchuria previously supplied from 35% to 40% of China's coal production - Fuhsin, Fushun, Kailan, and Peipiao Mines being the main contributors. Coal to Shanghai and coastal cities was largely supplied by Kailan and other mines in that vicinity at the port at Chinwangtao.

The December 31, 1946, "International Coal Trade" published by the United States Bureau of Mines, states in part as follows relative to shipments to Shanghai:

"..... Loadings since mid-July have become increasingly irregular.

with shipments during August and September, averaging just over 120,000 tons each, a drop of 30,000 tons from the previous figures ——— Stock piles at Shanghai at the end of August were estimated at 125,000 tons, but in view of the curtailed shipments from the Kailan mines it has been necessary to draw on these reserves with the result that stock piles at the end of October were down to 90,000 tons or 15 days supply ...."

This condition, we are advised, is typical at all principal centers throughout China.

In view of the troubled conditions in some parts of China, not all mines previously considered in the First State group are proposed for immediate rehabilitation.

The above mines are recommended for rehabilitation as best located to provide immediate relief, and having sufficient reserves to justify future modernization.

Upon the completion of this project, which will be accomplished in two or a little more than two years, there will be an increase of 6.15 million tons of coal per year in addition to the 6.15 million tons of present producing rate, making a total of more than 12.3 million tons a year (Table II).

Aside from these strategic coal mines, there are many other mines in China. The aggregate production of both groups are about 23 million tons for the present year, out of which the 8 mines under this project only contribute 6.15 million. After two years even all mines of less important groups keep on with their old production, whole China will produce 29.15 million tons of coal, which is almost equivalent to the pre-war figures.

COST OF IMMEDIATE REHABILITATION:

Basing on the Pierce figures for those they had definite estimates and following their standard of estimation for those they had not made estimates, it is required a total amount of US$ 24,334,426 for the eight mines under this project. Since some equipment and materials have already been obtained through UNRRA and a previous loan of 1.5 million U.S. dollars, proper deductions should be made from this amount. There leaves a deficit of US$ 19,023,815 for all the projected mines. Taking round figures and making slight modifications in accordance with recent developments, a budget of US$ 17,500,000 is necessary. (Table II) This amount is distributed as follows:

Fuhsin	US$ 3,900,000
Peipiao	800,000
Kailan	1,300,000
Chinghsing	500,000
Chunghsing	1,000,000
Yilo	500,000
Kaokang	6,500,000
Hsiangtan	3,000,000
Total	US$17,500,000

In this list the amount required for Fuhsin and a few others are far from sufficient. They will be so allocated just for a start.

The Kailan mines, Hopei Province, are jointly owned and operated with British and Chinese capitals. They have never suspended in work since their establishment. They suffered no loss in wartime, therefore their development work is quite easy to be carried out. Chunghsing in Shantung Province is the mine entirely owned by private capital and suffered serious loss for several times occupation of the Chinese Communists. The restoration work will be most difficult and requires much

more money than the above allocation. The Kaokang mines in Western Kiangsi will produce coking coal supplying the iron and steel works in Tayeh, Hupei Province. Such new developments require a relatively larger amount of fund. Hsiangtan mines in Hunan Province will also help in this work. As to the other mines, their increase in production as planned in this project cannot as yet reach their peak production in the pre-war days.

Some of the Northeastern mines, such as Fuhsin and Peipiao, can produce more, if more money is allocated to them. But being situated in a somewhat disturbed area, they are only restored to such a degree as they are required to contribute necessarily to the serious shortage of coal in other parts of China. Their extensive restoration work will therefore be left to a later date.

The mines selected are those which are susceptible to rapid increase in productivity, and accessible to rail lines to consuming centers. The mines in North China can ship their product to the Ports of Hulutao, Chingwantao, and later through Dairen to supply coastal cities.

MATERIAL AND EQUIPMENT REQUIRED:

While the requirement for each mine is different, the material and equipment wanted is, in general, of the following categories:

PowerPlant
Hoists
Fans
Pumps
Compressors, jackhammers, and accessories
Core drilling equipment
Mine and railroad cars
Steam locomotives
Rails and accessories
Lubricants and paints

Rope, manila and wire
Rubber hose
Miners tools
Machine shop equipment
Machine shop accessories
Machine shop tools and supplies
Electric cable and wire
Leather belts
Pipe and fittings
Structural steel and material
Mine lamps and charging equipment
Telephones
Office, surveying and drafting equipment
Mine timber
Coal laboratory equipment
Emergency hospital equipment and supplies
Engineering and supervision equipment
Coal stripping equipment
Rotary dump, skip and sinking buckets
Mine Rescue apparatus
Screen and picking table equipment
Dump truck and automobile trucks
Miscellaneous supplies
Miscellaneous equipment.

ESTIMATE OF REHABILITATION COST AND AMORTIZATION OF LOAN:

On the basis of the foregoing figures, a loan of $17,500,000 (US) should result in re-establishing China's prewar production and provide a sound basis for further expansion of coal production as contemplated in its industrial program.

Based on a loan of this amount, carrying interest at a rate of 2-1/2% and an amortizing period of 25 years, it will require annual payments of $950,250 to liquidate the loan with interest.

Based on a production from these mines of approximately twelve million tons per year, the amortizing charge is eight cents per ton.

COST OF PRODUCTION:

Due to scarcity and inflation, current costs are not representative and are of little use in determining normal, representative peacetime production costs.

The present day average production per man for Chinese coal mines is 0.25 tons per day.

This compares with an average production of three tons per man in Pennsylvania Anthracite mines having similar mining conditions.

In order to establish a sound industrial economy, greater efficiency must be established in Chinese mines, not only for reduction in operating cost, but also as means of reducing capital cost of new projects.

A comparison with the Anthracite mines of Pennsylvania which have similar conditions should prove of interest in determining the relatively financial ratios between these mines and the Chinese mines being considered.

	ANTHRACITE MINES	CHINESE REHABILITATION
Capital invested per ton annual output	$8.00	$1.40
Amortizing Charges	.38	.08
Amortizing charges in relation to investment	4.7%	5.5%
Tons produced per man day	3	.25

The rehabilitation material when added to existing plant and equipment of these mines will create a "going concern" value of approximately $5.50 per ton, and result in an amortizing charge of only 2% of total investment, compared with 4.7% of similar mines in the United States.

The foregoing favorable financial ratios, and the extremely present low efficiency of Chinese production give assurance that modernization will result in greater efficiency and cost reduction and that the proposed loan can be safely made on a self-liquidating basis.

The problem is not only one of engineering, financial and political justification, but also one of finding the foreign exchange to meet loan amortization requirements.

In order to assure adequate foreign exchange for repayment, we propose to allocate a portion of the tonnage for exports from these mines to:- (a) Japan, (b) Philippines, and (c) Hong Kong. In particular, the occupation force in Japan have pressed their requirement for a very substantial quantity of coal.

It should be possible to export a minimum of two million tons of coal per year to these sources which should provide foreign exchange to the extent of approximately $20,000,000 (U.S.) per year.

If only 10% of the value of these exports is earmarked for amortization, it would provide two million dollars per year for loan retirement.

APPENDIX

TABLE I

COAL RESOURCES OF CHINA
(in Millions of Metric Tons)

PROVINCE	TOTAL ESTIMATED RESERVE	ANTHRACITE	BITUMINOUS	LIGNITE	% OF TOTAL
Kiangsu	217	25	192	—	.090
Chekiang	100	22	78	—	.041
Anhwei	360	60	300	—	.149
Kiangsi	992	216	776	—	.411
Hupeh	440	160	280	—	.182
Hunan	1,764	1,043	721	—	.730
Szechwan	5,989	225	5,764	—	2.479
Sikong	531	3	401	27	.220
Yunnan	2,707	11	1,266	1,430	1.120
Kweichow-	1,788	774	1,014	—	.740
Kwangsi	300	—	300	—	.124
Kwangtan	421	50	371	—	.174
Fukien	396	291	105	—	.164
Sinkiang	6,000	—	6,000	—	2.483
Chinghai	500	—	600	—	.207
Kansu	1,500	—	1,500	—	.621
Ninghsia	488	166	322	—	.202
Shensi	71,950	750	71,200	—	29.776
Honan	7,764	4,455	3,309	—	3.213
Shansi	127,127	36,471	87,985	2,671	52.611
Shantung	1,639	26	1,613	—	.678
Hopeh	3,071	981	2,088	2	1.271
Suiyan	476	58	396	22	.197
Chahar	504	17	487	—	.209
Jehol	614	2	573	39	.254
Liaoning	1,836	187	1,649	—	.760
Kirin	1,143	2	986	155	.473
Heilung Kiang	1,017	6	619	392	.421
TOTAL	241,634	46,001	190,895	4,738	100,000

TABLE II PRESENT VS PROJECTED PRODUCTION OF COAL MINES

Item No.	Mines	Present Producing Rate		Projected Producing Rate		Minimum Rate to be increased in this plan	
		tons/day	tons/year	tons/day	tons/year	tons/day	tons/year
1	Fuhsin	5,000	1,500,000	10,000	3,000,000	5,000	1,500,000
2	Peipiao	1,000	300,000	3,000	900,000	2,000	600,000
3	Kailan	14,000	4,200,000	15,000	4,500,000	1,000	300,000
4	Chinghsing	——	——	3,000	900,000	3,000	900,000
5	Chunghsing	——	——	1,000	300,000	1,000	300,000
6	Yilo	small	production	1,000	300,000	1,000	300,000
7	Kaokang	small	production	5,000	1,500,000	5,000	1,500,000
8	Hsiangtan	500	150,000	3,000	900,000	2,500	750,000
	Total	20,500	6,150,000	41,000	12,300,000	20,500	6,150,000

TABLE III COMPARISON OF REQUISITIONS

Item No.	Mines	Original Requisitions: Drafted by Pierce Management	Original Requisitions: Estimated According to Pierce's Stds.	Allocations Already Obtained Thru: UNRRA	Allocations Already Obtained Thru: Previous Loan	Deficit	Adjusted requisitions for this loan
		US$	US$	US$	US$	US$	US$
1	Fuhsin	5,552,624	———	———	550,000	5,002,624	3,900,000
2	Peipiao	1,179,542	———	———	400,000	779,542	800,000
3	Kailan	1,245,832	———	———	———	1,245,832	1,300,000
4	Chinghsing	2,127,445	———	1,540,249	150,000	437,196	500,000
5	Chunghsing	———	1,128,000	———	———	1,128,000	1,000,000
6	Yilo	1,288,483	———	684,524	150,000	453,959	500,000
7	Kaokang	———	7,875,000	876,551	———	6,998,499	6,500,000
8	Hsiangtan	———	3,937,500	709,287	250,000	2,978,213	3,000,000
	Total	US$ 11,393,926	US$ 12,940,500	US$ 3,810,611	US$ 1,500,000	US$ 19,023,815	US$ 17,500,000

DEVELOPMENT OF PRODUCTION OF MINERALS FOR EXPORT

1. Projected Capital Investment

	U.S. Loan Requested	Domestic Investment Planned
Tin mines	US$ 1,500,000	US$ 2,500,000
Tungsten mines	3,000,000	4,500,000
Antimony mines	2,000,000	3,000,000
	US$ 6,500,000	US$10,000,000

2. Effect on Production and Profits

	Annual Production Present	Annual Production Projected	Sale Value (at Mine) of Increased Product*	Annual Profit on Increased product
Tin mines	1,000 m.t.	5,000 m.t.	US$ 3,168,000	US$ 528,000
Tungsten mines	4,000 m.t.	14,000 m.t.	10,675,000	2,860,000
Antimony mines	2,000 m.t.	12,000 m.t.	2,200,000	880,000

*Value based on estimated long-range prices; current prices are much higher.

Thus, assuming the requested credit were amortized over twenty years, it is clear that it could be carried and repaid without difficulty.

Yunnan Consolidated Tin Corporation --
Mines at Kouchiu, Yunnan Province

The tin deposits in the Kouchiu area, about 360 kilometers south of Kunming, are the best in China. Before the war exports of tin from this area averaged about 9,000 short tons per year, derived from a number of native mines and small smelters as well as from the operations now controlled by the Yunnan Consolidated Tin Corporation. The Japanese blockade cut off Kouchiu from outside sources of supplies and from markets abroad, and the plant there was bombed repeatedly by the Japanese. Thus during the period 1941-1945 production of tin was reduced to about 3,000 short tons yearly. Since the war, because of the continued inability of the mines to obtain necessary supplies and equipment, annual production has been further reduced to about 1,100 short tons of refined tin (99.8% Sn).

The National Resources Commission hopes eventually to expand the output of the Yunnan Consolidated Tin Corporation mines to 10,000 to 12,000 long tons per year. It is planned to put into effect immediately the initial recommendations of the survey made by Behre Dolbear & Company (Exhibit 10,) requiring an estimated capital expenditure of $235,000 to bring the mines' production immediately up to 2,000 tons per year. Upon the completion of necessary detailed surveys additional work is planned to raise annual production to 5,000 metric tons, of which 90 per cent would be available for export. It is expected that this program can be completed within three years.

Total costs for equipment and materials to be purchased in the United States are roughly estimated as follows:

Transportation equipment	US$	105,000
Mining equipment		250,000
Concentration equipment		490,000
Smelting equipment		445,000
Laboratory equipment		14,000
Total	US$	1,304,000
Plus 15% estimated for freight and insurance		196,000
Grand Total	US$	1,500,000

Expenditures in China estimated as equivalent to US$2,500,000 will also be required.

It is difficult to make an accurate estimate of production costs in terms of U. S. dollars in view of variations in the value of Chinese currency over the past two years. The cost and profit estimates prepared by Behre Dolbear present a very conservative picture. They estimate the cost of producing tin at Kouchiu at $0.296 per pound, calculated on the basis of the rate of exchange (CNC$2,020 to US$1) in effect as of August 1946; since then the official rate of exchange has changed to CNC$12,000 to US$1.

The cost of transportation from the mines to New York is estimated by Behre Dolbear at $0.165 per pound. On this basis the total cost of tin delivered in New York would be approximately 46¢ per pound. The market price in New York is now about 70¢ per pound. On this basis, refined tin would yield a net projit in New York of about 24¢ per pound, or $480 per short ton. The projected annual production of 5,000 metric tons per year at this price would yield a profit of approximately $2,640,000 annually to the Yunnan Consolidated Tin Corporation.

The sale abroad of 4,500 m.t. of tin, at a price of 70¢ per pound, would provide China with foreign exchange amounting to over $6,000,000 per year.

As Behre Dolbear & Company's report points out, the present market price of tin cannot be expected to continue at its present level, considerably above the prewar price or the controlled wartime price. However it may be assumed that as the world price for tin declines, the cost of delivering Chinese tin to the United States will also tend to decline substantially as a result of the reduction in the exorbitant transportation costs from the mine to an ocean port. Moreover, the Chinese production and transportation costs shown in the Behre Dolbear report are based upon conversion of Chinese into American dollars at a very low rate of exchange.

Kiangsi Tungsten Mines

The wolfram mines in southern Kiangsi have been in the past the largest producers of tungsten ore in the world, because of their rich deposits, the ease of operation and the availability of cheap labor. Probable reserves of the four principal mines are estimated at 550,000 tons of 65% WO_3. Prewar operations were very primitive, completely unmechanized.

As a result of the war and the occupation of this area by the Japanese, the mines were shut down for some time. Resumption of production has been hampered by much higher labor costs and a lowering of the grade of ore processed. Thus mining efficiency must be increased through mechanization if the prewar levels are to be regained and maintained.

According to the report of Behre Dolbear & Company (Exhibit II, page 2), "the present ore exposures, although not systematically sampled, analyzed or mapped, leave little doubt that potential reserves are large, and suggest that adequate development may establish them to be the largest reserves in the world."

Average annual production of tungsten concentrates (60% WO_3 basis) from southern Kiangsi deposits in the years 1936-1943 exceeded 8,000 metric tons per year. Present production, under difficult and often primitive conditions, is at the rate of about 4,000 metric tons of 65% WO_3 ore. The NRC plans, through further development and mechanization of mines, to reach an annual production of 14,000 metric tons of 65% WO_3 tungsten ore, of which 95 per cent will be available for export. It is estimated that this program can be completed in three years.

The requirements of equipment and supplies from the United States required for completion of this work total an estimated $3,000,000, divided roughly as follows:

Power plant equipment	US$	690,000
Development equipment		368,000
Mining equipment		488,000
Milling equipment		500,000
Transportation equipment		85,000
Ore testing equipment		80,000
Machine shop equipment		67,400
Road construction equipment		120,000
Surveying equipment		20,000
Other materials		190,000
Total	US$	2,608,400
Plus 15% estimated for freight and insurance		391,600
Grand Total	US$	3,000,000

In addition, an investment in Chinese currency is required, estimated as the equivalent of US$4,500,000.

According to the Behre Dolbear report (page 9), "Quotations for tungsten ores and concentrates, duty paid, at New York, have held at around $24.00 per short ton unit since 1941, a period of 5 years. This is equivalent to slightly more than $16.00 per unit for Chinese ores (before duty) . . . . Assuming freight and handling charges on ore from Chinese mines at $60.00 per ton, the present value of tungsten concentrate at the Kiangsi operations would be about $15.00 per unit."

On the basis of their surveys of four mines, and assuming a value of $15.00 per short ton unit at the mine, Behre Dolbear & Company estimate the profit per short ton unit of ore at from $3.50 to $4.82 at current prices. Ore of the quality to be mined from these deposits would yield a profit at any price down to and including $10.00 per unit of WO_3. Assuming $4.00 profit per short ton unit, the profit on 65% WO_3 tungsten concentrates would be $260 per short ton, or about $286 per metric ton. A production of 14,000 metric tons per year would yield a total profit of over $4,000,000.

The export of 90 per cent of this production would bring China over $13,500,000 in foreign exchange.

Hsikuanshan Antimony Mines

These mines, located near Sinhua, Hunan Province, have long been the world's most important source of antimony. Reserves are estimated at some 500,000 tons of antimony metal. Before the war these mines produced about 10,000 metric tons of antimony regulus (99.8% Sb) each year. During the war the mines were shut down, and subsequently some caved in or were flooded owing to lack of maintenance. There has been little mining activity since operations were stopped by the Japanese occupation in 1944.

In the past, antimony mining and smelting operations in this district have been quite primitive, using tools and powder of local manufacture and depending solely on manpower to bring the metal out of the mine. Only the richer ore was extracted. Inefficient smelting operations produced a waste slag of high antimony content, and lost over 20 per cent of the metal in stack gases for lack of adequate cooling and condensing equipment. As the depth of the mines has increased these primitive operations have become more difficult and expensive and in some cases mining has been stopped by underground water. Immediate rehabilitation and mechanization of operations is essential if Chinese antimony exports are to recover.

The NRC's plans envisage an increase in the production of these antimony mines from the present low level of about 2,000 metric tons per year of antimony regulus to 12,000 tons, of which about 80 per cent will be available for export. It is estimated that the development program can be completed in three years.

The requirements of equipment and supplies from the United States for this work total an estimated $2,000,000, divided roughly as follows:

Power plant equipment	US$	450,000
Exploration equipment		130,000
Mining equipment		350,000
Concentration equipment		100,000
Smelting equipment		710,000
Total	US$	1,740,000
Plus 15% estimated for freight and insurance		260,000
Grand Total	US$	2,000,000

In addition, an investment in Chinese currency is required, estimated as the equivalent of US$3,000,000.

The tentative cost estimates contained in Behre Dolbear & Company's report (Exhibit III) indicate a cost of about 6¢ per pound of antimony recovered, or about $132 per metric ton. The metal would have a sale value at the mine of at least 10¢ per pound or $220 per ton. (At the current high New York price of about 30¢ per pound the value would be more than doubled; moreover, the projected rehabilitation of the branch railway from Sinhua to Hsiangtan would greatly reduce transportation costs and increase the value of the metal at the mine.) On this basis a production of 12,000 m.t. of antimony regulus would yield a profit of $936,000 annually.

Assuming that 80 per cent of the metal were exported the return to China in foreign exchange would be at least 12,000 x $220, or $2,640,000 per year.

(8)

Tientsin, 4th August, 1947.

Statement of Tugs and Lighters available for Transportation of cargo in Tientsin Harbour August 1947

	Tugs	Lighters	Dead weight capacity
Tientsin Lighter Co.	3	14	6,540 tons
China Merchants Steam Navigation Co.	14	18	8,850 "
Dah Hwa (Great China Corporation)	2	3	800 "
Lien Mao	3	5	1,600 "
	22	40	17,790 tons

NB. In 1940 the number of craft registered with the Customs Tientsin was:

Tugs	Lighters	Dead Weight Capacity
97	208	60,000 tons

Details of Tugs & Lighters at present available are given below:-

Tientsin Lighter Co.

Lighters

		Capacity EACH	TOTAL
9	"A" Class lighters	450	4050
3	"B" " "	550	1650
2	"C" " "	420	840
14			6540 tons

Tugs

2	Nos. 1 & 2	350 h.p.)	Capable of towing 2 lighters
1	Chenyang	450 h.p.)	Taku Bar to Tientsin.
3			

China Merchants Steam Navigation Co.

Lighters		Capacity EACH	TOTAL
5	"D" lighters	500	2,500.-
1	No. 3	500	500.-
4	Nos. 1,3,5,7.	500	2,000.-
4	Nos. Lu 3,4,10,12.	450	1,800.-
1	Tengten	600	600.-
1	Taku	500	500.-
1	Kai Ping	500	500.-
1	No. 140	450	450.-
18			8,850. tons

Tugs

1	Kuo Tsin	H.P. varies from 200 to 400. suitable for proceeding to Bar but in some cases towing only one lighter at a time.
1	Kuo Lan	
1	Kuo Wan	
1	Kuo Loo	
1	Kuo Tsang	
1	Kuo Chi	
1	Kuo Tung	
1	Kuo Ku	
1	Kuo Yung	
1	Kuo Shu	
1	Kuo Tang	Suitable for River only towing one lighter at a time.
1	Kuo Yen	
1	Ho Yu	Suitable for river only, not for towing.
1	Fei Lu	
14		

Dah Hwa (Great China Corporation)

Lighters		Capacity EACH	TOTAL	
2	Nos. 101, 98	200	400	for river only
1	No. 146	400	400	for Taku Bar
3			800 tons	

Tugs

1	Hwan Ho	about 350 H.P. suitable for proceeding to Taku Bar.
1	Pei Yien	
2		

Lien Mao

Lighters		Capacity EACH	TOTAL	
1	Hsin Foo	500	500	Suitable for Taku Bar.
1	Hsin Lee	350	350	
1	Kiang Cheng	300	300	
1	Kiang Ping	300	300	
1	Hsin Mao	150	150	- For River work only.
5			1600 tons	

Tugs

Tien Lung, Tien Yun, Kwong Yi - 250 H.P. Suitable for towing one lighter at a time.

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IX

DEVELOPMENT OF FERTILIZER PRODUCTION

DEVELOPMENT OF FERTILIZER PRODUCTION

I. INTRODUCTION AND SUMMARY

The healthy development of the Chinese economy and raising of the living standard of the Chinese people depend in large part upon an expansion of agricultural production. As a result of very intensive cultivation of China's arable land over centuries there has been serious soil depletion in many areas, accelerated during the war. The natural fertilizers traditionally used to restore the fertility of the fields have been insufficient in quantity, and it is necessary to supplement them. Extensive experiments with chemical fertilizers indicate that their use would substantially increase the yields of the most important Chinese crops; one ton of fertilizer will increase yields of rice, wheat, cotton, or other products by as much as three tons.

Chinese imports of chemical fertilizers expanded steadily before the war, reaching a peak of nearly 168,000 tons in 1937; in addition about 100,000 tons were used in Manchuria under Japanese control, and over 300,000 tons in Formosa. If the war had not interrupted it is probable that the expansion of fertilizer imports would have continued. The use of chemical fertilizers in China, however, is still substantially below that of other major countries. To obtain maximum benefits it has been calculated that nearly 11,000,000 tons should be used annually.

China's present production of fertilizers is very small -- only about 85,000 tons annually. Because of the world shortage of fertilizers, also, it is difficult to increase imports substantially. A considerable expansion of the Chinese capacity can be effected, however, at relatively small cost, and will result in very substantial benefit to Chinese agricultural production. The National Resources Commission of China has developed a project for production of fertilizers at the rate of about 630,000 tons per year -- comprising 426,000 tons of ammonium sulphate, 34,000 tons of ammonium nitrate, and 170,000 tons of superphosphate. The details of this project are summarized in the following pages. A credit of $50 million is required for the purchase of necessary equipment, supplies and services in the United States.

The estimates of the National Resources Commission are based on the cost of new equipment. When it appeared that part of the necessary equipment might be obtainable from United States war surplus, National Resources Commission engineers developed an alternative plan for producing substantially similar amounts of fertilizer using the facilities available in certain ordnance plants in the United States, which would have required only about $32 million credit.

The Chinese Supply Commission, on behalf of the Government of China, has already bid on certain of these surplus facilities, and is exploring the possibility of obtaining others. It is probable, however, that many items essential to the NRC plan will not be declared surplus and will have to be purchased from new production. Thus approval of the full $50 million credit is requested. It is the Chinese Government's intention, however, to obtain as

much as possible through surplus channels, in order to reduce the cost of the project and to save as much time as possible in the procurement of the equipment.

The estimated profits from the sale of fertilizers in China will easily suffice to carry these credits and amortize them over a period of 15 years. China's foreign exchange balance will also be aided to a very substantial extent by the increase of agricultural production and the consequent reduction of food imports into China. The value of the increase of crop yields to be expected from proper use of the 630,000 tons of fertilizer produced by these plants is conservatively estimated at nearly $800 million per year.

II. NEED FOR FERTILIZERS IN CHINA

China is basically an agricultural country — over 80% of the population are farmers — and any healthy economic development or permanent rise in the Chinese standard of living must depend in substantial part upon increased agricultural production. China's arable land is generally cultivated very intensively, producing two or three crops a year in many areas. This has resulted in a considerable depletion of soil fertility over the years — a process which has been accelerated during the past decade of war — so that the feeding of the Chinese population may present a growing problem.

Even in the normal years before the war large quantities of food had to be imported. Statistics in the Sun-Pao Yearbook of 1934 show annual average imports of 16,000,000 piculs of rice, 11,000,000 piculs of wheat, and 5,000,000 piculs of wheat flour for the period from 1923 to 1934. Since the defeat of Japan it has been necessary to supplement domestic food production with UNRRA shipments and foreign purchases by the government.

Experience has demonstrated, however, that increased use of fertilizers will greatly increase the output of food and other agricultural products. In the past manure has been the major source of plant nutrients in China, but it has not been available in sufficient quantity. It must be supplemented by chemical fertilizers.

The first recommendation of the recent Hutchison Agricultural Mission is "that increased emphasis be placed on the construction of chemical fertilizer plants;" and their Report goes on to state:

"A substantial increase in the use of suitable fertilizers would add a great deal to the national production of agricultural crops. Careful field tests, conducted by the National Agricultural Research Bureau, have shown that the use of fertilizers, particularly nitrogen, usually gives significant increases in yields. Phosphorous fertilizers are needed in a few numbers of cases, and potash still less frequently. The Japanese found, both in Japan and in Taiwan, that it is profitable to use substantial applications of chemical fertilizers in addition to the usual forms of manure

commonly used in China today. Besides increasing yields, fertilizers frequently increase the mineral content of crops, thus improving their nutrient value.

"The most promising source of additional supplies of fertilizer appears to be chemical fertilizers. While an improper use of such fertilizers may not increase yields, when used properly they give excellent results."

"Chemical fertilizers will not be used widely in China until they are offered to farmers at a price which makes their use profitable. They were not so offered in many parts of China before the war. It would appear more likely to occur in the future if a large part of the needed supply is manufactured within China.

"The element of plant food most in demand is nitrogen. For rice, ammonium sulfate is the nitrogen-bearing fertilizer in common use in most countries. Tests have shown that ammonium nitrate loses a part of its effectiveness when applied to rice paddies, but it is a good fertilizer for upland crops like wheat or cotton.

"The current demand for nitrogen fertilizers in all parts of China, including Taiwan, is somewhere around 400,000 metric tons a year, but officials of the National Agricultural Research Bureau believe that the demand is likely to increase rapidly. Taiwan alone consumed in 1938 nearly 300,000 metric tons of nitrogen fertilizers, the average application being about 50 kilograms of nitrogen (equivalent to 250 kilograms of ammonium sulfate) per hectare. Although this Mission has not attempted to estimate carefully the probable demand for fertilizers it seems reasonable to believe on the basis of information at hand, that the demand in all of China could shortly become several times greater than at present, provided fertilizers are offered at reasonable prices and an effective agricultural extension program is undertaken to teach farmers the value of their use."

Imports of chemical fertilizers began some years before the war, as shown in Table I.

TABLE I

Fertilizer Imports Into China, 1928-1937

(in metric tons)

Year	Fertilizer Ammonium Sulphate	Phosphate and Others	Total
1928	106,279	-	106,279
1929	100,914	48,603	149,517
1930	193,361	40,361	233,722
1931	140,436	34,399	174,835
1932	113,521	3,303	116,824
1933	101,271	4,885	106,156
1934	49,948	3,885	53,833
1935	68,633	2,876	71,509
1936	122,796	2,716	125,512
1937	163,434	4,187	167,621

The apparent decline of fertilizer imports after 1932 is due to the Japanese occupation of Manchuria and the subsequent exclusion of Manchurian imports from the Chinese Customs records. By 1937, however, imports of fertilizers for China south of the Great Wall had increased to nearly 168,000 metric tons, and it is probable that but for the outbreak of war fertilizer consumption in China would have continued on this upward trend. In addition to the imports shown in this table the consumption of fertilizer in Manchuria amounted to about 100,000 tons per year, and in Formosa over 300,000 tons, which must now be included in the Chinese requirements.

Effect of Chemical Fertilizers on Chinese Production

The reaction of Chinese soils to chemical fertilizers is very favorable. Mr. N. F. Chang, Head of the Soils and Fertilizers Department of the National Agricultural Research Bureau, gives the results of 271 experiments, conducted at 85 localities in 14 provinces, from 1935 to 1940. The increase in acreage yields of rice, wheat, cotton and rape seed achieved by applying chemical fertilizers are shown in Table II below, 65% of the 85 localities showed an increase in economic returns from rice production by the use of nitrogenous fertilizers. (Table III on page 5). In studies of soil deficiencies it was shown that nearly all the rice-producing areas suffered from a nitrogen deficiency and that a similar deficiency in phosphates existed in a substantial proportion of these localities. The deficiencies were less serious in areas devoted to other crops but were nevertheless of considerable importance (Table IV.).

The average increase in production obtained by using proper chemical fertilizers is summarized in Table V. According to Dr. J. L. Buck's survey of 16,334 farms located in 150 hsiens and 22 provinces in China, for the years 1929 to 1933, the average yield of rice was 2,310 pounds per acre and that of wheat 980 pounds per acre. These figures correspond generally with those given in the International Agricultural Yearbook for 1933 and 1934, which show 2,666 pounds of rice and 1,003 pounds of wheat per acre. Based on Dr. Buck's figures an increase of 31% in rice production would raise the average yield for China to 3,030 pounds per acre, and an increase of 23% for wheat production would raise the yield to 1,200 pounds per acre. These expectations are by no means unreasonable, as can be seen by comparing them with the average acreage yields for these two crops in other countries shown in Table VI.

TABLE II

Increase of Acreage Yields from Applying Chemical Fertilizers

Crops	Increase in pounds in acreage yields achieved by using: Ammonium sulphate at rate of 264 lb./acre	Superphosphate at rate of 290 lb./acre	Potash sulphate at rate of 106 lb./acre
Rice	753	534	400
Wheat	726	321	-
Cotton	265	140	118
Rapeseed	334	398	164

TABLE III

Increased Economic Returns Gained by Using Chemical Fertilizers at Various Localities

Crops	Percentage of Localities Showing Increase in Economic Returns From Nitrogenous Fertilizer	Phosphatic Fertilizer	Potash Fertilizer
Rice	69	32	7
Wheat	24	16	-
Cotton	45	16	26
Rapeseed	39	39	4

TABLE IV

Deficiencies of Plant Nutrients in Chinese Soils

Crops	Percentage of Localities Showing Deficiencies in Plant Nutrients: Nitrogen	Phosphate	Potash
Rice	96	45	18
Wheat	71	31	9
Cotton	42	22	24
Rapeseed	85	35	16

TABLE V

Average Increase in Farm Production by Using Proper Chemical Fertilizers

Crops	Average Increase of Production
Rice	31%
Wheat	23%
Cotton	26%
Rapeseed	48%

TABLE VI

Average Acreage Yield of Rice and Wheat in Various Countries

Country	Rice	Wheat
Italy	4070 lbs/acre	1253 lbs./acre
Japan	3212	1576
India	1267	651
Great Britain	---	1901
U.S.S.R.	1487	616
U.S.A.	2112	814
Germany	---	1930

According to Mr. N. F. Chang, to increase total crop production in China by the percentages shown in Table V would require 6,400,000 tons of ammonium sulphate, 3,800,000 tons of superphosphate, and 300,000 tons of potash sulphate annually. In addition Japanese records show a consumption of fertilizers in Formosa of 350,000 tons annually. Thus total Chinese fertilizer requirements amount to a little less than 11,000,000 tons per year.

This level of fertilizer consumption cannot, of course, be achieved in the immediate future. The demand for fertilizers is acute throughout the world and there is a current shortage of production capacity which will presumably continue for some time to come. Fertilizers are still under allocation. Total production in the United States, the principal producer of chemical fertilizers, amounted in 1946 to something over 12.5 million tons, principally (so far as nitrogenous fertilizers are concerned) ammonium nitrate, which is unsuitable for use in Chinese rice fields. The UNRRA program for China called for shipment of 316,450 tons of fertilizers in the year 1946-47; because of the shortage, only 70,000 tons have been delivered.

China cannot hope, therefore, to increase its imports of fertilizer very substantially in the near future. Moreover, the overland and ocean freight and handling charges for imported fertilizer greatly increase its cost to the Chinese farmer. The current price of imported ammonium sulphate in Shanghai is CNC$10,000,000 per ton (United Credit Information Bureau, June 2, 1947), equivalent to US$833 at the official rate of exchange. Obviously such a price is far beyond the means of the ordinary farmer. It is much more economical and practical, therefore, to establish plants for fertilizer production in China as recommended in the Hutchison Mission Report, quoted above.

Existing capacity for fertilizer production in China is very small. Japanese bombing completely destroyed the Canton Fertilizer Works, including a newly finished ammonium sulphate plant. The Yungli Chemical Company's capacity has dropped to about one-half its former level as a result of destruction and misuse during the Japanese occupation. Parts of the equipment from the Chinsi Refinery, which could have been converted to a fertilizer plant, were removed by the Soviet forces and additional equipment has been destroyed by the Communists. At present there is a single plant of the Yungli Chemical Company, producing about 70 tons of ammonium sulphate per day; it is hoped to expand this capacity within the next two years to about 220 tons per day. There are also three plants in Formosa producing 200 tons of cyanamide and superphosphate fertilizers. The total production of the entire country at present is thus only about 85,000 tons per year.

III. PLANS FOR INCREASING CHINESE FERTILIZER PRODUCTION

The National Resources Commission has plans drawn, sites selected, a skeleton organization established, and key personnel trained for the construction and operation of new plants for producing ammonium sulphate,

ammonium nitrate and superphosphate. These plants will be located at Canton and at two locations in Taiwan respectively. A brief description of the plant sites is attached as Appendix A. Their estimated cost is as follows:

Canton ammonium sulphate plant	US$28,000,000 plus CNC$240,000,000,000
Taiwan ammonium sulphate plant Shinchu on the Northwest Coast of Formosa	US$17,000,000 plus CNC$120,000,000,000
Taiwan superphosphate plant Kao-shiung (Takao)	US$ 5,000,000 plus CNC$ 40,000,000,000
Total	US$50,000,000 plus CNC$400,000,000,000

These locations were chosen for the following reasons (See also Appendix B):

1. They provide easy access to raw materials. All three are on the seacoast near adequate port facilities. Coal and coke can be brought either from North China, or in the case of Canton, from mines located near the Canton-Hankow Railroad. Pyrites deposits at Yingteh 125 kilometers north of Canton on the railway, and at Kingkwasheh (Kinkaseki) and Suaifan in Formosa will supply most of the requirements for sulphur. Sulphur is also produced at the rate of about 30,000 tons per year at Taitunsan in Formosa, and the production can be expanded.

2. Upon completion of the planned rehabilitation of power facilities in the Canton area and in Taiwan, adequate cheap power will be available for the fertilizer projects.

3. All three locations are ideally situated in relation to markets and especially to the areas in which fertilizers are most required. Taiwan's sugar production requires large quantities of fertilizer. Canton has traditionally been the distribution center in China proper for ammonium sulphate and the need for fertilizers is especially great in the rice-producing areas of South China which will be served by the Canton plant.

Table VII on Page 8 presents a comprehensive summary of the three projects, including their capital cost, the volume of production, the estimated production cost and estimated annual profit for the three plants. A breakdown of the estimated US dollar cost for the Canton ammonium sulphate plant is shown in Table VIII on Page 9; that for the Taiwan ammonium sulphate plant is shown in Table IX on Page 10; and that for the Taiwan superphosphate plant in Table X on Page 11.

Table VII

SUMMARY OF FERTILIZER PROJECTS
(With New Equipment)

Location	Canton Ammonium Sulphate Plant Canton	Taiwan Ammonium Sulphate Plant Shinchu, Taiwan	Taiwan Superphosphate Plant Kao-Shiung, Taiwan	Total
Total Investment U. S. Currency Chinese Currency	$28,000,000 CNC240,000,000,000	$17,000,000 CNC120,000,000,000	$5,000,000 CNC40,000,000,000	$50,000,000 CNC400,000,000,000
U. S. Loan Requested	$28,000,000	$17,000,000	$5,000,000	$50,000,000
Production, yearly Ammonium Sulphate, tons Ammonium Nitrate, tons Superphosphate, tons Total, tons	261,800 17,000 — 278,800	164,900 17,000 — 181,900	— — 170,000 170,000	426,700 34,000 170,000 630,700
Cost of Production, Estimated Ammonium Sulphate, per ton Ammonium Nitrate, per ton Superphosphate, per ton	$43.99 $76.75 —	$42.21 $74.13 —	— — $24.05	
Total Annual Sales, Estimated Ammonium Sulphate @ $60/ton Ammonium Nitrate @ $100/ton Superphosphate @ $30/ton	$15,708,000 1,700,000 —	$ 9,894,000 1,700,000 —	— — $5,100,000	$25,602,000 3,400,000 5,100,000
Total Annual Sales Estimated	$17,408,000	$11,594,000	$5,100,000	$34,102,000
Total Annual Production Cost	12,821,332	8,220,639	4,088,500	25,130,471
Total Annual Profit Estimated U.S.$	$ 4,586,668	$ 3,373,361	$1,011,500	$ 8,971,529

Table VIII

CANTON AMMONIUM SULPHATE PLANT

CAPITAL REQUIREMENT IN U.S. CURRENCY

		U. S. $
Buildings, Structures and Overhead Cranes		1,817,000
Processing Equipment		16,784,000
Ammonia (225 tons per day)	10,636,000	
Sulphuric Acid (600 tons per day)	3,764,000	
Ammonium Sulphate(770 tons per day)	1,084,000	
Nitric Acid (80 tons per day)	750,000	
Ammonium Nitrate (100 tons per day)	550,000	
Mining Equipment for Pyrites		210,000
Process Steam & Emergency Power Plant		880,000
Water Supply Equipment (11,500,000 gal. per day)		411,000
Repair Shop Equipment		537,000
Power Plant (25,000 KVA)		2,750,000
Yard & Miscellaneous Facilities		1,039,000
Imported Spare Parts & Supplies		192,000
Freight Charges & Insurance		2,450,000
Foreign Advisers for Engineering & Design		930,000
Total		U.S.$28,000,000

Table IX

TAIWAN AMMONIUM SULPHATE PLANT

CAPITAL REQUIREMENT IN U.S. CURRENCY

		U. S. $
Buildings, Structures and Overhead Cranes		1,307,000
Processing Equipment		11,865,000
Ammonia (150 tons per day)	7,260,000	
Sulphuric acid (400 tons per day)	2,500,000	
Ammonium Sulphate(490 tons per day)	805,000	
Nitric Acid (80 tons per day)	750,000	
Ammonium Nitrate (100 tons per day)	550,000	
Process Steam & Emergency Power Plant		390,000
Water Supply Equipment (5,760,000 gal. per day)		136,000
Repair Shop Equipment		310,000
Yard & Miscellaneous Facilities		780,000
Imported Spare Parts and Supplies		137,000
Freight Charges and Insurance		1,575,000
Foreign Advisers for Engineering & Design		500,000
		U.S.$17,000,000

Table X

CAPITAL REQUIREMENTS IN U. S. CURRENCY

TAIWAN (Kao-Shiung) SUPERPHOSPHATE PLANT

(Capacity: 170,000 tons per year)

	Equipment U. S. $	Building Structures U. S. $	Total U. S. $
Superphosphate Plant, 500 tons/day			1,385,000
Material Handling	300,000	55,500	
Crushing & Grinding	106,000	58,000	
Proportioning	80,000	—	
Mixing & Cutting	185,000	63,000	
Fluorine Recovery	25,000	7,000	
Storage	10,000	420,000	
Ammoniation	8,000	—	
Bagging	36,000	31,500	
Sulphuric Acid Plant, 200 tons/day			1,448,000
Contact Plant with Sulphur Burners	850,000	60,000	
Material Handling for Pyrites	50,000	—	
Crushing & Grinding	14,000	10,000	
Herreshoff Furnaces	316,000	80,000	
Cottrell Precipitators	60,000	8,000	
Services and Facilities			1,567,000
Water Supply	216,000	33,200	
Substation & Power System	340,000	2,900	
Railway	312,000	—	
Locomotives & Cars	156,000	—	
Mobile Equipments	120,000	—	
Warehouses	6,000	9,000	
Laboratory	16,000	12,400	
Repair Shop	120,000	65,000	
Office	64,000	22,500	
Fence, Gates, etc.	—	22,000	
Contingencies	50,000	—	
Total	$3,440,000	$960,000	
Ocean Freight & Insurance			350,000
Engineering Fees			250,000
Grand Total			$5,000,000

The NRC alternative plans for use of American war surplus equipment, in the event it became available, are shown in Table XI on Page 13. While some of this equipment can probably be obtained from surplus, the most important units listed -- the ammonium producing facilities at the Ohio River and Cactus Ordnance Works -- are being retained by the War Department. It is uncertain, therefore, how much surplus material can be obtained; thus NRC plans at this stage are based upon the expectation of purchasing all needed equipment from new production. However, the Chinese Supply Commission has already bid on the sulphuric acid facilities and expects to satisfy part of the requirements thereby. The possibility of obtaining other equipment from this source is under active investigation, and surplus facilities will be used to the fullest extent possible in order to reduce the cost of the project and the time required for delivery of equipment.

IV. FINANCIAL JUSTIFICATION OF THE FERTILIZER PROJECT

Anticipated profits

The capacities of the three fertilizer plants as projected by NRC are shown in Table XII on Page 14. Substitution of some surplus equipment may alter these quantities slightly but the difference will not be material.

The estimated production cost for ammonium sulphate, ammonium nitrate and superphosphate from these plants is worked out in detail in Appendix C. On the basis of this estimate the cost of producing ammonium sulphate will be $43.99 per ton; that for ammonium nitrate $76.75 per ton; and that for triple superphosphate $24.05 per ton. The comparable costs for importing these fertilizers are $76.60, $102.60 and $62.60 respectively. If it is possible to obtain a substantial part of the necessary equipment from war surplus facilities, the Chinese production costs will be reduced somewhat, as a result of lower amortization and interest charges.

Assuming selling costs of $60 per ton for ammonium sulphate, $100 for ammonium nitrate, and $30 for superphosphate, the total annual profit from these operations will be $8,971,529.

Because of the long period required to complete delivery of the necessary equipment and erection of the plants in China, capacity operation probably cannot be attained before the fourth year following approval of the project. It is proposed, therefore, that although interest charges should be paid annually from the start, repayment of the principal should begin only with the sixth year, and the entire loan should be liquidated by the end of fifteen years. Assuming an interest rate of not more than 3% per annum, maximum payment on the loan in any one year would be $6,900,000, which would leave an ample margin for reserves and contingencies.

Contribution to the Chinese Economy

The figures quoted earlier on the average increase in yield resulting from the use of chemical fertilizers indicates that 630,000 tons of fertilizers, if properly used, might increase crop yields by as much as $800 million a year. This conclusion is based on the following calculation: (continued on page 15).

Table XI

SUMMARY OF FERTILIZER PROJECT
(Using War Surplus Equipment)

	Canton Ammonium Sulphate Plant	Taiwan Ammonium Sulphate Plant	Taiwan Super-phosphate Plant	Total
Location	Canton	Shinchu, Taiwan	Kao-Shiung, Taiwan	
Surplus Equipment	Ohio River, Badger, Kentucky Ord. Works	Cactus, Keystone, West Virginia Ord. Works	Plancor 2100 and Surplus Sulphuric Acid Plant	
Production, yearly Ammonium Sulphate, tons	233,000	157,000	---	390,000
Ammonium Nitrate, tons	44,000	26,000	---	70,000
Superphosphate, tons	---	---	170,000	170,000
Total, tons	277,000	183,000	170,000	630,000
Procurement Cost, Estimated	U.S.$2,200,000	U.S.$ 2,080,000	U.S.$ 420,000	U.S.$ 4,700,000
Cost of Supplementary Equipment, dismantling, shipping, etc.	U.S.$12,250,000	U.S.$11,060,000	U.S.$ 3,920,000	U.S.$27,230,000
U. S. Loan Required	$14,450,000	$13,140,000	$ 4,340,000	$31,930,000
Capital Investment U.S. Currency	$14,450,000	$13,140,000	$ 4,340,000-	$31,930,000
Chinese Currency	CNC240,000,000,000	CNC120,000,000,000	CNC40,000,000,000	CNC400,000,000,000
Total Annual Profit * (Estimated)	U.S.$ 4,600,000	U.S.$ 3,100,000	U.S.$ 1,000,000	U.S.$ 8,700,000

* Cost of production will be somewhat lower than those given in Table VII.

Table XII

CAPACITY OF THE FERTILIZER PROJECT WITH ENTIRELY NEW EQUIPMENT

	Canton $(NH_4)_2SO_4$ Plant			Taiwan $(NH_4)_2SO_4$ Plant			Total Annual Production Tons
	Installed Capacity Tons/day	Operating Capacity Tons/day	Tons/year	Installed Capacity Tons/day	Operating Capacity Tons/day	Tons/year	
Ammonia	225	225		150	150		
Sulphuric Acid	600	590		400	370		
Ammonium Sulphate	770	770	261,800	490	485	164,900	426,700
Nitric Acid	80	40		80	40		
Ammonium Nitrate	100	50	17,000	100	50	17,000	34,000
Total			278,800			181,900	460,700
				Taiwan Superphosphate Plant			
Superphosphate				500	500	170,000	170,000
Sulphuric Acid				200	167		

Notes: 1. All quantities in metric tons.

2. One year is assumed to be 340 operating days.

3. The difference between installed capacity and operating capacity is designed to provide flexibility of production to meet market demands for two kinds of nitrogen fertilizers and to adjust the production to the supply of sulphur or pyrites.

The experiments summarized in Table II, page 5, indicate that the proper use of one pound of fertilizer will increase rice production by about three pounds. At the current price of CNC$400,000 per picul (i.e. CNC$6,000,000 per ton), the application of each ton of fertilizer would result in increased rice yields of CNC$18,000,000. 450,000 tons would increase yields by CNC$8,100,000,000,000, or US$675,000,000 at the current rate of exchange.

Similarly, the proper application of one ton of superphosphate increased rice yields by about two tons; thus 170,000 tons of superphosphate per year will increase rice production by 340,000 tons. This quantity will have a value of CNC$1,440,000,000,000 or US$120,000,000. This increase in production will have an immediate effect on China's foreign exchange balance, either by permitting a reduction in food imports or making available additional food products for export.

Attached as Appendix D are letters from Drs. C. B. Hutchison and Raymond T. Moyer, Chief and Deputy Chief, respectively, of the U. S. Agricultural Mission to China, and from Dr. F. W. Parker of the U. S. Department of Agriculture, endorsing the project for expansion of fertilizer production in China.

Appendix A

Plant Site

I. Canton Ammonium Sulfate Plant

Land: To be purchased.
Facilities: Wharf for 4,000-ton freighter, two railroads, railway siding, and highway. See map in Fig. 1.

II. Taiwan Ammonium Sulfate Plant

Land: 500 acres with improvements.
Buildings: Offices, laboratories, hospital, dormitories, etc.
Warehouses.
Facilities:
- Water works: 800,000 gal./day
- Natural gas: 3,000,000 cu. ft./day, 18 miles away.
- Steam plant: 100,000 lbs./hour
- Railway and siding.
- Highway and waterways.
- See map in Figure 2.

III. Taiwan Superphosphate Plant

Land: To be purchased.
Facilities: Railway, ocean transportation and waterways, highway, and old 90-ton superphosphate plant nearby.

I. Canton Ammonium Sulfate Plant

A. Coke and coal from Shehping, 170 miles from works by rail, or from North China by coastal freighters.
B. Pyrites from Yingteh mines, 100 miles from works by rail, or 120 miles by inland waterways.
C. Power to be generated in the works.

II. Taiwan Ammonium Sulfate Plant

A. Natural gas, now only 3,000,000 cu. ft. per day, furnished by the wells in Chinshwei, Taiwan, 19 miles from the works.
B. Coke and coal, furnished by Chutung mines, 20 miles from the works.
C. Pyrites shipped from Mahanshan mines near Nanking, or from Kingkwasheh mines, 70 miles from works by rail.
D. Power, at $0.003 per K.W.H., furnished from large network of Taiwan Power Company

III. Taiwan Superphosphate Plant

A. Coal from Keelung mines, 280 miles by coastal freighter, or 220 miles by rail from works.
B. Phosphate rock, from Haichow 900 miles from works by coastal freighter.
C. Pyrite from Kingkwasheh, 280 miles by coastal freighter, or 220 miles by rail from the works.
D. Power from Taiwan Power Co.'s network at $0.003 per K.W.H.

Appendix C

I. CANTON AMMONIUM SULFATE PLANT

Estimated Production Cost

1. Estimated Factory Cost of NH_3
(225 tons of NH_3 per 24 hours, 340 days per year)

	Unit Cost U. S. $	Cost per Ton U. S. $
Raw Material		
1.1 tons coal per ton of NH_3 for steam, etc.	@ 10.00	11.00
1.7 tons coke/ton	@ 15.00	25.50
Labor 312 man-days/day	@ 3.00	4.16
Power 1,800 K.W.H./ton	@ 0.006	10.80
Depreciation and maintenance		22.20
Total Cost of NH_3 per Ton		$73.66

2. Estimated Factory Cost of H_2SO_4
(590 tons per 24 hours, 340 days per year)

	Unit Cost U. S. $	Cost per Ton U. S. $
Raw Material		
Pyrites 0.825 ton/ton	@ 12.50	10.31
Labor 69 man-days/day	@ 3.00	0.35
Power 70 K.W.H./ton	@ 0.006	0.42
Depreciation and maintenance		2.96
Total Cost of H_2SO_4 per ton		$14.04

3. Total Cost of $(NH_4)_2SO_4$ (770 tons per 24 hours, 340 days per year)

	Unit Cost U. S. $	Cost per Ton U. S. $
Raw Material		
0.26 tons of NH_3/ton	@ 73.66	19.15
0.76 tons of H_2SO_4/ton	@ 14.04	10.68
Labor 86 man-days/day	@ 3.00	0.33
Power 15 K.W.H./ton	@ 0.006	0.09
Depreciation and maintenance		0.85
Overhead		3.00
Taxes and Insurance		1.50
Interest on U. S. Loan, Chinese Capital Expenditures and Operating Fund		6.39
Packaging	@ 2.00	2.00
Total Cost per Ton of $(NH_4)_2SO_4$		$43.99

4. Estimated Total Cost of NH_4NO_3 (50 tons per day, 340 days per year)

	Unit Cost U. S. $	Cost per Ton U. S. $
Raw Material		
0.46 tons of NH_3/ton	@ 73.66	33.88
Labor 56 man-days/day	@ 3.00	3.36
Power 495 K.W.H./ton	@ 0.006	2.97
Depreciation and maintenance		21.87
Overhead		5.00
Taxes and Insurance		2.50
Interest on U. S. Loan, Chinese Capital Expenditure and Operating Fund		5.17
Packaging		2.00
Total Cost per Ton of NH_4NO_3		$76.75

Appendix C - Continued

Annual Profit

From $(NH_4)_2SO_4$, 261,800 tons

Selling Price	@ U.S.$ 60.00	15,708,000.00	
Total Cost	@ U.S.$ 43.99	11,516,582.00	
			U.S.$4,191,418.00

From NH_4NO_3, 17,000 tons

Selling Price	@ U.S.$100.00	1,700,000.00	
Total Cost	@ U.S.$ 76.75	1,304,750.00	
			U.S.$ 395,250.00
Total Annual Profit			U.S.$4,586,668.00

APPENDIX D

UNITED STATES DEPARTMENT OF AGRICULTURE

Office of Foreign Agricultural Relations
Washington 25, D. C.

June 6, 1947

Mr. Shou-Chin Wang
Chairman, Chinese Supply Commission
2311 Massachusetts Ave., N. W.
Washington, D. C.

Dear Mr. Wang:

This is in reply to your letter of April 26 in which you tell of plans to acquire certain United States plants for the manufacture of chemical fertilizers in China. You raise the question of an endorsement of this project as a start in carrying out one of the recommendations of the China-United States Agricultural Mission, on which I served.

Not feeling qualified to speak with regard to its manufacturing aspects, I forwarded a statement of the proposed plan to Dr. Frank W. Parker, Assistant Chief of the Bureau of Plant Industry, Soils and Agricultural Engineering of this Department, in Charge of Soils. Enclosed for your reference is a copy of a memorandum which he wrote after a review of your plan.

Enclosed, also, is a letter on this subject received from Dean C. B. Hutchison, Dean of the College of Agriculture and Vice-President of the University of California, and Head of the American Section of the Agricultural Mission. As you will see in reading their statements, both of these men comment favorably on the proposal.

As seen from my former experience in China and the studies made recently in connection with the Agricultural Mission, I would be glad to associate myself with the statement of Dean Hutchison. The evidence, I believe, is clear that the fertilizers which it is proposed be manufactured could readily be absorbed in China and used to the farmers' advantage. Of the steps that ought to be taken to improve the agriculture of China I am convinced that the manufacture of nitrogenous and phosphate fertilizers as you plan, should be given an important place and high priority.

Sincerely yours,

(Signed)

Raymond T. Moyer
Head, Far East Division

OFFICE MEMORANDUM *** *** *** UNITED STATES GOVERNMENT

Date May 13, 1947

To: Raymond T. Moyer, Office of Foreign Agricultural Relations

From: F. W. Parker, Assistant Chief of Bureau, In Charge of Soils

Subject: Chinese Government Purchase of U. S. Plants for the Manufacture of fertilizers

This is in reference to your memorandum of May 7 transmitting copy of statement by the Chinese authorities on "Fertilizer Plants for China" which we have reviewed rather carefully.

In view of the well-known need for greatly expanded use of fertilizers in China, the proposed plan for increasing the indigenous production of plant food in the form of commercial fertilizer seems to us to be entirely reasonable. Also, the proposed geographical distribution of the additional facilities seems logical.

It is suggested that it would be desirable to explore carefully the possibility of producing urea at those plants where the hydrogen for ammonia synthesis will be made with the use of coal or coke. At such plants the carbon dioxide required for urea manufacture would be available as a by-product. Production of urea would afford a material having double the nitrogen content of ammonium sulfate and would eliminate the need for sulfuric acid. It is our understanding that China is not well supplied with raw material sources of sulfur for sulfuric acid manufacture.

Attachment

UNIVERSITY OF CALIFORNIA
College of Agriculture
Agricultural Experiment Station

Office of the Dean & Director
Berkely 4, California

May 27, 1947

Dear Doctor Moyer:

You have asked my opinion, as Head of the United States Section of the China - United States Agricultural Mission which studied agricultural conditions in China last summer, of the proposed plan of the Chinese Government for the purchase of equipment to manufacture fertilizers in China.

Although the Mission made no effort to investigate the technical details of the manufacture of fertilizers in China, it did conclude that through a judicious use of fertilizers it would be possible to increase substantially the yields of food crops in that country. As to the merits of the particular proposal, I am not competent to speak. I note, however, that Dr. Frank W. Parker and his group at Beltsville, in whose judgment I have full confidence, have examined the plan and report that in their judgment it appears to be entirely reasonable.

I am glad to hear that steps are being taken by the Chinese Government to increase the production of fertilizers in China. I hope they will succeed for I know of no more effective means of immediately increasing food production there. Chinese farmers have to rely too much on night soil with its attendant hazard to human health and upon the rather wasteful use of oil-seed cake of various kinds for the maintenance of the fertility of their soils. If more chemical fertilizers were available and at reasonable cost, more oil cake could be used for feeding animals, whose products - milk, eggs and meat - would greatly improve the diet and health of the people.

I am sure it would not be feasible for China to undertake to import the fertilizers she needs. In the first place, they are not available in the quantities she needs, and in the second place, the costs would be prohibitive to Chinese farmers. She needs to develop a sound plan for manufacturing them in China and at the lowest possible cost consistent with sound financing, in order that they may be sold to the Chinese farmer at a price that will yield him the greatest net returns.

Anything the United States can do to assist China in developing a sound program for the manufacture of fertilizers will not only be helpful to China but in the long run to the advantage of the United States.

Very sincerely yours,

/s/ C. B. Hutchison

C. B. Hutchison
Dean, College of Agriculture
Vice-President of the University

Dr. Raymond T. Moyer
Office of Foreign Agricultural Relations,
U. S. Dept. of Agriculture

LAND UTILIZATION MANCHURIA - 1945

	HECTARES	ACRES
Total Area Land	115,280,944	282,457,913
Swamp 14,598,282) Alkali 2,354,810) - Uncultivated Others 33,877,134)	50,830,326	124,534,299
Forests	31,513,070	77,207,022
Land in Crops	16,591,837	40,650,000
Land which can be developed	16,353,711	40,066,592

	AREA - 1945		PRODUCTION - 1945	
	Area Hectares	Acres	Metric tons	Lbs.per acre
Kaoliang	3,705,487	9,078,443	4,956,634	1,090
Soybeans	3,304,837	8,096,851	3,476,728	859
Corn	3,118,040	7,639,198	4,122,526	1,079
Millet	2,354,860	5,769,407	3,187,318	1,105
Wheat (85% Spring)	524,124	1,284,104	393,302	613
Broom Corn	424,034	1,038,883	368,499	709
Rice (wet)	343,263	840,994	755,537	1,797
Rice (upland)	41,724	102,224	42,936	840
Potatoes	323,328	792,154	2,094,547	5,288
Cotton (American)	205,449	503,350	118,858	472
" (Native)	16,918	41,449	5,804	280
Buck Wheat	208,788	511,531	142,517	557
Oats	190,606	466,985	141,621	607
Barley	101,412	248,459	80,339	647
Castor Beans	149,374	365,966	84,875	356
Small Beans	128,717	315,357	1[illegible],791	682
Mung Beans	40,596	99,436	[illegible],134	566
Other Beans	84,866	206,947	64,686	625
Hemp (Ramie)	116,787	286,128	48,422	338
Hemp (Blue Ropes)	20,965	51,364	10,924	425
Hemp (Kenaph, Rope)	88,716	198,521	95,101	937
Perilla (Varnish Oil)	67,445	165,240	39,046	473
Tobacco (American)	29,876	73,196	30,969	846
" (Native)	15,432	37,808	8,371	443
Sugar Beets	24,661	60,419	219,988	7,282
Peanuts	9,362	22,937	10,211	890
Sesame	6,809	16,678	26,061	309
Sunflowers	5,810	14,235	3,256	457
Opium	3,343	8,190		
Alfalfa	2,547	6,240		
Fruit Orchard	36,794	90,146		
TOTAL	15,778,671	38,650,391	20,678,224	

UNRRA Agricultural Officer Estimates Nationalists Now Control Only 15 to 20% of Cultivated Land in Manchuria (August 4, 1947).

(Data Collected by UNRRA Agricultural Officer)

A. The foodstuff production in whole Northeast China, in 1946, including both nationalist controlled and non-controlled areas, is shown as follows:

Commodities	Total of Northeast m.tons	Controlled areas m.tons	non-controlled a. m.tons
Soy beans	2,930,000	960,000	1,970,000
Oil seeds	144,000	44,000	100,000
* Staple cereals	9,540,000	5,000,000	4,540,000
* Wheat	840,000	34,000	806,000
* Rice	350,000	174,000	176,000
* Others	1,106,000	320,000	786,000
Total	14,910,000	6,532,000	8,378,000

Note: Staple cereals include kaoliang, millet and maize.
Oil seeds include castor, peanuts, perilla, sesame and sunflower.
Others include barley, oats, buck wheat and other beans.
* Foodstuffs.

B. The figures given above, compared with the average figures during the preceeding ten years, are estimated at about 20% less, and the shortage in volume is estimated at 2,500,000 m.tons in the total and at 1,868,000 m.tons in foodstuffs (*) production, as shown in the following table:

Commodities	Total of Northeast 10 years' average	1946	%	Controlled areas 1942 **	1946	%
Soy beans	3,480,000	2,930,000	85	1,250,000	960,000	77
Oil seeds	240,000	144,000	60	74,000	44,000	60
Staple cereals	10,600,000	9,540,000	90	6,030,000	5,000,000	82
Wheat	840,000	840,000	100	53,000	34,000	64
Rice	700,000	350,000	50	356,000	174,000	49
Others	1,890,000	1,106,000	70	550,000	320,000	59
Total	17,410,000	14,910,000	81%	8,328,000	6,532,000	70%

(Date collected by Dr. Pan, Director, Dept. of Agriculture, Northeast Economic Commission)

AVERAGE MONTHLY QUOTATIONS US$ AND N.E.C. NOTES

US $1.00

	Mukden (N.E.C.)	Tientsin (C.N.C.)	Shanghai (C.N.C.)	N.E.C. per C.N.C.
April 1946	198	1,994	2,020	-
May	225	2,486	2,020	-
June	208	2,458	-	-
July	243	2,828	-	-
August	257	2,855	-	10.75
September	345	3,383	3,809	10.11
October	443	4,200	4,120	9.55
November	396	4,412	4,448	10.82
December	509	5,889	5,847	11.06
January 1947	631	6,787	5,745	10.94
February	986	11,064	11,939	11.01
March(official)	952	12,000	12,000	11.00

(Above statistics released by the Research Bureau of Economic Commission of the Northeast Headquarters)

Note
Official rate for US $1.00, from Aug 19, 1946 --- 3,580 CNC
" " " Feb 16, 1947 --- 12,000 CNC
Official buying rate US $1.00 " " " " --- 952 NEC

Compiled by T. Tani, 8/2/47

Black Market Averages (approximately)

March 1947	1045
April	1380
May	2800
June	3650
July	4480

Special Rates Granted US Govt Establishments by Central Bank

March 28, 1947	---	952.
May 16		991.67
June 6		2888.33
June 17		2191.67
July 8		2880.78
July 23		3790.29
July 31		3176.09

A.S. Abbott

NORTHEAST SHALE OIL PRODUCTION

July 1947, Fushun.

20 shale oil retorts operating out of total 140. Daily production 75 tons crude oil and 15 tons by-product ammonium sulphate.

20 additional retorts prepared to operate if open pit mine can furnish sufficient oil shale.

Listed below are pre-war figures from "Handbook on Manchuria, 1939", by S. M. R. Staff Assoc.

	1930	1932	1935	1937
Shale treated (m. tons)	1,265,810	1,417,658	2,495,296	2,900,000
Crude oil	71,308	72,108	102,299	145,000
Heavy oil	28,576	43,276	67,347	75,000
Crude paraffin	10,606	13,899	23,347	20,000
Coke	2,606	3,599	5,979	15,000
Sulphate of ammonium	13,834	16,416	23,301	24,800
Gasoline (kiloliter)	-	942	1,646	22,000

* * *

MANCHURIAN TEXTILE INDUSTRY

July 4, 1947
per Mr. S.C. Fu,
China Textiles Industry
Inc.

Questions and Answers:

1. No. of spindles in Govt areas.
   205,228.

2. No. of spindles in Comm areas.
   189, 872.

3. No. of spindles in operation in Govt areas.
   120,000 - but at present complete steppage due shortage electric power.

4. Estimate of amount of raw cotton used since Oct 1946.
   10,000,000 lbs.
   Estimate of cotton needed until Dec.
   27,000,000 lbs.

5. Expected source of raw cotton until Dec.
   It is still possible to purchase from local farmers.

6. Chief problem in cotton milling in Manchuria.
   Electricity, coal and textile accessories.

7. Looms available and looms in operation.
   5000 available and 2400 in operation.

8. Estimate of raw cotton production in Govt areas this summer from cotton farms.
   30,000,000 lbs this autumn.

9. Any comments on the cotton situation in Manchuria.
   The quality of local cotton is good enough for spinning purposes.

10. Cloth, yarn and raw cotton prices.
    Cotton cloth 12 lbs (31" x 40 yds) NEC $45,000 per pc.
    Cotton yarn 20's (400 lbs.) NEC $1,015,000 per bale.
    1st class local raw cotton NEC $1,500 per kg.

COTTON TEXTILE MILLS IN NORTHEAST
(Nationalist Area)

1. Liaoyang
2. Yingkow
3. Antung*
4. Chinchow
5. Wafangtien*

* Antung and Wafangtien under Communist control at present.

July 15, 1947 -- Press reports 50,000 spindles operating in NE.

Hsiaofengman Hydro-electric Plant - 130,000 KW (operating 2 units)

Thermal Plants

	Output July 29, 1947	1943
Fushun	38,000 KW	285,000 KWs
Peipiao (will be incr.)	8,000	
Chinhsi	8,000	
Anshan* (now use 5000)	8,000	73,500
Chinchow	3,000	
Penhsi* (soon incr.)	3,000	77,000
Fuhsin (2 pkg.units)	2,000	160,000
Mukden Arsenal	2,500	
Yingkow*	400	

* Anshan and Penhsi have own thermal power units independent of Power Admin.. China Textiles at Yingkow also have own plant.

Mr. K. T. Kuo Director NE Power Admin., stated that by the end of September Fushun will produce 50,000 KW as 2 more boilers are being installed. Anshan and Penhsi will also increase their outputs to 15,000 and 10,000 KW respectively toward the end of the year.

Since the minimum needs of the industrial cities of southern Liaoning Province are 150,000 KWs, priorities have been set up as follows:

Present allotments.

1. Coal mines - 36,000 KW (of which 25,000 to Fushun)
2. Anshan Iron and Steel Works - 5,000 KWs
3. Cement mills - 1,000 KWs
4. Textiles (principally Chinchow) - 1700 KWs
5. Milling of grains - 4-5,000 KWs
6. Mukden and factories west Mukden - 10,000 (13,000 KWs at night)
7. Others.

The demand for Mukden alone is about 40,000 KWs and at present only ¼ of demand is met, due to the fact that the transmission line from Hsiaofengman is cut (as of May 13, 1947). Mr. Kuo stated that until the high-voltage line from Hsiaofengman through Meihokow is taken from the Communists and repaired there will continue to be a serious shortage of electric power in Mukden and other industrial cities in Liaoning Province. The power line through Meihokow has a capacity for 220,000 KWs and when usable delivers 80,000 KWs to Mukden for further distribution. The power line from Hsiaofengman to Changchun can carry 150,000 KWs and the line from Changchun to Mukden 66,000 KWs. Thus when the power from Hsiaofengman is transmitted to Mukden via Changchun and Ssupingkai only 6,000 KWs reach Mukden. Most of the milling of grains and crushing of oil seeds is done with power supplied at night (after 11 PM.).

Mr. Kuo told the press on July 29th that the monthly income of the Power Admin. is TP$1 billion and expenditures 1 billion 700 millions; and his reasons for this operating loss are 1) with Hsiaofengman power line cut, the Admin. has had to increase coal purchases from 30,000 m. tons a month to 55,000 tons to supply thermal units. He states that coal prices have been increased from TP$9,000 to 20,000 per m. ton. 2) Less power means less income. 3) Heavy repair bills for Communist damaged installations.

NORTHEAST RAIL TRANSPORTATION
(Nationalist Area)

1943 - All of Manchuria

11,000 kilometers of track
2,400 locomotives (S.E.E. figures)
30,000 freight cars
3,000 passgr. cars

Local press figures given 6/7/47 for rail equipment taken over by the Nationalist armies when they entered Manchuria.

730 locomotives
7,359 freight cars
754 passgr. cars

Former Japanese industrialist estimated less than 3,000 freight cars in the Northeast in late June 1947.

Local press stated that before Communist offensive in May 1947 there were 3,400 kms of rail track in operation, and now (July 1947) only 2,300 kms.

As of July 29, 1947, Northeast rail service radiates from Mukden to Kaiyuan, Tashihchiao, Hanchamu, Penhsi, and Shanhaikuan (and on to Peiping). 40 of 190 kilometers of damaged line Mukden to Changchun reported repaired.

* * *

Current Production at Anshan

Aug. 5, 1947

		March 1947	July 1947 rated	July 1947 actual	
Freight car wheels	(pcs.)	600 per month	1000	750	(due to shortage of coke & fighting)
Freight car axles	(pcs.)	100 " "	500	400	(due to fighting & draft labour)
Steel rods	(m.t.)	1500 " "	1500	800	(##########)
Plates 4'x8'x3/16'' to 3/8"	(m.t.)	--	1000	700	(due shortage of elec. power)
Wire rope	(m.t.)	100	300	50	" "
Light rails up to 16 kg. Angles up to 5", etc.		--	1000	500	" "
Sheets 2'x4'-6'x1/16" to 1/32"		50	50	30	" "
Nails of various sizes (drums of 60 kg)		200	1000	700	" "
Butt weld pipes (1/2' to 2")	(m.t.)	500	300		

No. 1 Open Hearth (100 toner) is scheduled to pour steel on Aug. 5, No. 7 coke oven to produce coke on Aug. 15, and the blooming and billet mill to start rolling on Aug. 20. We are lucky to have an electric power plant ourselves, but it is still insufficient. The shortage has effected the production to the extent that only one shift is being worked, and even during the working shift, suspension of power supply is quite often.

Penshihu and Fushun at present are producing some alloy steel,; about 30-50 tons per month at each place.

(Prepared by C. C. Shao, President, Anshan Iron and Steel Co. Ltd.)

Nanking, July 14th, 1947

Mr. Wong Yen Hao, Chairman,
National Resources Commission,
Nanking.

Dear Mr. Wong,

Facing the present-day coal situation realistically, counting with the fact that for the present coal from Manchuria may not be available for the coastal region, and that the coal fields of the North may not be counted on safely as sources of supply,—I had a talk with Mr. Sun Fu-ami, Vice Chairman of the N.R.C. In his realistic way of thinking, he accepted my assumptions with regard to coal from Manchuria and North China. We both agreed that speedy and drastic measures will have to be taken to increase the output in the producing coal fields of Central China, in developing as quickly as possible the already producing fields along the Yangtze and, if possible, to open new fields in the same regions,—always bearing in mind transportation possibilities to the coast, the minimum time necessary to come into production, and, of course, the necessity to work within existing financial possibilities of the Central Bank of China for required foreign exchange.

Needless to say, that a further breakdown in coal deliveries may jeopardize the already limited production of commodities and that a substitution of imported oil or coal for domestic coal is possible only to a limited extent. Thus the question of more coal in sure regions is a question of paramount importance.

Mr. Sun is now preparing a course for coal production. He will soon go into the field to look into the possibilities of extending old and developing new mines. If time permits, I may go with him. In the meantime, we decided that I visit the Kwainan Coal Mines which, next to Kailan, are the biggest producing unit, in order to size up the possibilities for increasing production there. Here are my observations, reached after spending three days at the collieries with the fullest cooperation from the mine administration:-

I made the trip to Chui Lung Kan accompanied by Mr. C. T. Hsieh, Director of the Mineral Exploration Bureau of the N.R.C. The railway was guarded all along the line; blockhouses and pillboxes were seen in close succession. Chiu Lung Kan, the administrative center of the coal fields, makes the impression of a well administered little town: good roads, good streets, simple houses, gardens. The mining camps themselves have simple

houses

houses with one-room and two-room arrangements per family, with water and light and public bath facilities. I saw no recreation facilities for the miners, such as moving pictures or radio; but there were several small playgrounds. A small club was available for the staff, with a small library. The whole mining area with its camps is fenced in with barbed wire which at night is kept under a charge of 400 volts. There are blockhouses on all hilltops and pillboxes are strewn throughout the area.

Administration. The coal fields belong to the Kwaiyuan Coal & Railway Company; the stock is owned by the K.M.T., the China Development Corporation and some individual stockholders. The population of the area administered by the coal company comprises about 40,000 people who make their living either directly or indirectly from the Company. 7,000 miners work underground; 5,000 workers are employed on the surface. The administrative personnel comprises about 400 persons, fulfilling all the functions of city administration. The administration supports three primary schools and one middle school for about 1000 children, with a teaching staff of about 40. The administration also sustains a small hospital with 8 doctors and about 20 nurses. The technical personnel is as follows: 40 mining engineers, 8 electrical engineers, 10 civil engineers and 15 mechanical engineers.

All workers and employees are supplied with housing, water, lighting. Around the mines, special bathing facilities for the miners are also provided. All laborers are employed through contractors--about 50 in number--who work on a commission basis. The wage system for underground workers is on a piece basis; all surface workers work on a time basis. Flour ground in a Company mill or rice are supplied as part of wages. Administration stores also supply basic commodities. Workers' houses have individual kitchens; for single men a common mess is provided. Up until now labor was not organized; but at present two organizers--one from the Ministry of Social Affairs and another from the Provincial Government--have arrived to organize a labor union.

The administration also employs 700 policemen who guard the area under officers from the State, and a garrison of about 500 men are located in the area. The police force is also used to guard the coal trains from the mines to the destination.

Coal Fields. Three collieries are at present in operation, using about 900 mining cars. Coal is now being mined at levels between 150 meters and 240 meters. A new 300 meter level is in preparation. Present production is about 2,400 tons per 24-hour day, with 7,000 miners working in three eight-hour shifts,--which means 0.3 tons per miner in eight hours, or the production of one ton by three miners in eight hours.

The

The 240 meter level, although still in full operation, is going towards exhaustion and, therefore, the new 330 meter level is in preparation in No. 1 Colliery. The shaft for this new level is completed. An old steam hoist, bought from the Italian Mining Administration, is on the spot and so are all other accessories. Production will begin toward the end of this year.

In the same colliery a second shaft is sunk to 180 meters, but it may take another two years before the 330 meter level is reached. A 1,000 HP electric hoist, bought from [redacted], is on the spot.

In No. 2 Colliery a new shaft has been sunk down to 260 meters, but the administration believes that about seven months will be required to reach the depth of 330 meters. For this shaft a 1,000 HP electric hoist--also bought from [redacted]--is on hand; also the steel headframe, bought from A.M.A.

Although the new shaft on the 330 meter level in No. 1 Colliery will operate next year, the administration assures that the average production for 1948 of the three collieries, including the coal from the new shaft, will [redacted] THE PRESENT PRODUCTION of 2400 tons daily, due to the gradually sinking production of the 240 meter level. There is a possibility of getting more coal from a newly discovered field--about 25 kilometers away from the old field--of which I will write below.

The coal of the three collieries is long-flamed, high volatile. A recent analysis shows the following:

Moisture	-	1.8%
Volatiles	-	38.1%
Fixed Carbon	-	41.8%
Ash	-	11.8%
Sulphur	-	1.[illegible]%
Calorie value	-	7309

Coking Coal. Mr. Walsh discovered that the coal in some areas is good coking coal. Big quantities seem to be available. To date, this coking coal was not separated from the regular coal and was shipped out together with it. Coke samples were made from washed coal: a kind of metallurgical coke resulted, with the following analysis:

Moisture	-	0.81%
Volatiles	-	2.48%
Fixed Carbon	-	84.24%
Ash	-	12.80%
Sulphur	-	1.04%
Calorie value	-	7090

I shall

I shall bring you a sample of this coke. Since the question of coke is one of great importance, I will take up the matter with the Shanghai office of the Coal Company. A thorough investigation should be made without delay and if the coke proves of the right quality, beehive ovens should be put up.

Equipment at the Mines.

Pumps. The collieries have little gas and not much water. About 40 large and small centrifugal pumps, ranging from 200 HP to 75 HP, with a total capacity of 7 tons per minute against a height of 130 meters, are in operation. Underground fire is fought constantly.

Ventilation is poor. In addition to natural draft, four old Japanese built electric blowers are in operation: one 125 HP, 1800 cu.meters per minute, and three 25 HP each, 250 cu. meters per minute. The Company bought from [illegible], for future installation: one centrifugal blower with a capacity of 88,000 cu.ft. per minute against 8-inch water gauge; and also two small Japanese-made blowers with about 100 cu. meters per second.

Mechanical Equipment of the Collieries. The equipment is antiquated and in poor shape. The hoists and compressors are of different manufacture, of Germans and Japanese make, often brought in second-hand, and some of the equipment is in service over 40 years. Accidents are correspondingly high. The hoists and compressors are partly steam driven, partly electrical, and some of the compressors are self-contained gasoline-driven units.

The following enumeration of installed equipment will give you a clearer picture:

No. 1 Colliery:

		Lifting Capacity
A. Steam hoists:	1 - 270 HP	1½ ton
	1 - 250 HP	1 ton
	1 - 200 HP	1 ton
B. Electric hoists:	3 - 100 HP each	0.6 ton each
	1 - 150 HP	1.2 ton
	1 - 350 HP, installed, but have never worked, because certain parts are missing.	
C. Air Compressors:	1 Electric driven - 200 HP	
	1 Electric driven - 100 HP	
	1 steam driven - 100 HP	

All serving 10 Japanese-made jack-hammers and 10 new hammers from [illegible]

No. 2 Colliery:

No. 2 Colliery:

			Lifting Capacity
A.	Steam hoists:	2 - 150 HP each	0.6 ton each
		1 - [illegible] HP	1.0 ton
B.	Electric hoists:	3 - 150 HP each	1.2 ton each
		2 - 100 HP each	1.0 ton each
C.	Air Compressors:		
		1 electric driven - [illegible] HP	
		1 " " - 150 HP	
		1 " " - [illegible] HP	

All serving 90 hammers.

No. 3 Colliery:

			Lifting Capacity
A.	Steam hoists:	1- 150 HP	0.6 ton
		1 - 300 HP	0.6 ton
B.	Electric hoists:	1 - 75 HP	1.0 ton
		1 - 40 HP	0.5 ton
C.	Air Compressors:		
		1 electric compressor - [illegible] HP	
		serving about 10 hammers.	

Note: In addition to this equipment, two 1000 HP electric hoists were received from [illegible], as mentioned above, but are not operating now.

Repair Shop. To keep the antiquated and partly superannuated equipment in working order, a well-equipped repair shop with foundry is a necessity,--otherwise there may be breakdowns in production. The few old tools in the present roughnecks building cannot do the job. I assume that the required tools can be had from [illegible] supplies or from other government agencies which took over surplus supplies. Payment for such equipment would perhaps be made by the Company in coal. I will take this matter up with the Shanghai office of the coal Company.

Power Plant. This is a sad story. Because of lack of water at the coal fields, the Japanese built the power plant on the Kwai River, about six kilometers from the mines. They put up a big steel-concrete building, with foundations for two 6000 KW modern turbogenerator units, for a pressure of 450 lbs and a 750 deg. F. temperature. Only a few boiler parts were delivered. Instead, there is installed and working in this big empty building a General Electric turbogenerator, **over 30 years old**, with a capacity of 2500 KW, 3300 volts, with a low steam pressure of 150 lbs., and with two correspondingly old Babcock & Wilcox boilers. This machine has no automatic regulator, no over-speed tripping device, and must be operated manually. The vacuum is very low, the coal consumption very high--over 2.2 kgs. per K.W.H. With such a unit, reliability of service is out of question.

In

In a separate building two Allis Chalmers turbogenerators, 1600 KW each, 3300 volts, also about 30 years old, with characteristics similar to the one described above, are in operation. Reliable service cannot be expected here either. These units should be taken out of service as early as possible.

The Company has bought from [redacted] a modern 2000 KW turbogenerator set. The whole unit of turbogenerator, boilers, surface condenser, is installed on one floor; a self-contained cooling arrangement for cooling water is attached. This equipment is installed in a separate building and works very nicely. The voltage is 6300. The installation was made by the engineers of the Company without outside assistance,—while a similar unit, newly installed at Pootung power plant, had the services of two British engineers for several months. This speaks for the engineers at the plant.

A similar [redacted] unit of the same 6300 voltage, but with a capacity of only 1000 KW, is delivered, but housing is not ready, and it will probably take several months before the installation will be ready to operate.

As you see, the small capacity of 8300 KW is installed in four separate buildings, with three different voltages—3300, 2300 and 6300 volts,—which makes synchronization of the old machines and of the old and new machines impossible. It would be safe to say that the reliable capacity is only the capacity of the [redacted] machines,—which is 3000 KW. When the new [redacted] hoists and blowers will begin to work there will be an acute shortage of power.

Power Distribution. There is one step-up outdoor substation for 22,000 volts, well built, and two step-down substations from 22,000 to 3300 volts. The further distribution goes down to 380 and 220 volts, but big motors are directly supplied with 3300 volts.

The whole distribution system is weak and needs repairs permanently. If production is to be maintained, the Company must see to it that a bigger and safer power supply is provided. I know how difficult it will be to do this, even if the financial difficulties are met.

The Hsu Kuai Field. Although the three old collieries will not be able to produce more coal this year or next, there is a possibility to increase coal production, to some extent this year, and to a bigger extent next year.

Mr. Meich has discovered a new coal field last fall at a distance of 25 kilometers from the old mines, and it seems to be a very promising field. So far, 18 borings have been made and an area of 7½ kilometers by 3 kilometers has been explored. Coal was found in all 18 borings

at

at different depths, the shallowest--40 meters, and the deepest--210 meters. The strata are regular, the decline from the horizontal, on the average, about 18 deg. Only one inclined pit is sunk. Work on it began on day 8th of this year. A second shaft will be sunk right now. A small account of coal is already on the surface from a seam at least 2 meters thick. At present electric power is not available and the necessary driving power for the hoist is an interesting antecedent. The steam hoist is driven not by steam, but by compressed air which is supplied from two self-contained gasoline operated compressors. A third compressor is in reserve. A power line for 600 KVA from the old power plant is under construction. Copper wire, insulators and transformers are on hand.

Because of the small decline from the horizontal, the administration intends to use an underground belt conveyor transportation system, thus eliminating hoisting and haulage. Under given geological conditions, this may be an economic thing to do, but I think it is a pipedream to assume that the Company has the slightest chance this year to get the thousands of meters of 36-inch belting, the big number of special electro-motors, the big quantity of cable, thousands of roller bearings, etc., etc.,--even if the financial difficulties could be solved. This project will probably have to be postponed for better times. But I do believe that vertical shafts could be sunk rather quickly and coal deliveries under the old method of production could begin soon. For such work, at any rate for the first shaft, hoists, rails, cars, etc. are available at the mines. I will talk with the Shanghai office of the Coal Company and will urge them to be realistic and, instead of trying what is at present impossible, to start producing coal in the new field by the old method.

Road Building. To make the new field easily approachable about 40 kilometers of new roads will have to be built shortly. There are in Shanghai, in the hands of different government agencies, unused road building machinery. I, therefore, proposed to the mine administration to try to get bulldozers, graders, rollers, stone-crushers, etc., under a lease arrangement from one or the other government agency and to pay with coal for the lease of this machinery. I hope my proposal can be carried out. The mine administration told me that they have similar arrangements with the Tax Department under which they exchange coal for TAT, and another arrangement with the Kunming Cement Company under which they exchange coal for cement.

Railway. Before the war the former owners of the coal mines operated a railway line belonging to them--running from the coal mines to the Yangtze port of Yu Chi Kou, and from there distributed the coal along the Yangtze. In this way the coal company controlled the coal deliveries. The Japanese destroyed this railway

and

and used the material to build a new railway line connecting the mines with the Tientsin-Pukow railway, using Peng-Pu as a junction, the line being 80 kilometers long. This new line now belongs to the Government and is operated on a lease arrangement by the Yunnan Company. The railway has a nice administration building at Chiu Lung Kan.

In operation are 17 locomotives with a traction power of 700 tons, and 300 coal wagons of 30-ton capacity. From Peng-Pu the coal is delivered on the Tientsin-Pukow Railway to Nanking, Hankow, etc. The Tientsin-Pukow Railway, which uses this coal for their line, hauls it in their own cars. So far, the railway could take care of the whole coal production without difficulties. A good railway repair shop, well equipped, is operated at Chiu Lung Kan.

The Yunnan Company is going to rebuild the old railway to the Yangtse port with a loan from the Government's banks. Rails, bins, etc. have been ordered in the United States; delivery is expected toward the end of this year. The weight of the rails is 75 lbs. per yard. I talked with the construction engineers and they told me that all metal bridges were destroyed by the Japanese, but that temporary wooden bridges are now under construction. They lack timber, pipes, etc., but hope to be ready when the rails arrive. I was told that the road bed is in good order.

The railway is being extended to the new coal fields.

Summary. The above shows:

1) The whole equipment of the mines is old, uneconomical, and not too safe.

2) There is little mechanization.

3) Ventilation is insufficient.

4) The main capacity of the power plant is very small and insufficient to supply the needs, especially after the new electric hoists and blowers are installed.

5) All this results in a very low productivity: the output of three men in eight hours is only one ton.

6) The modern part of the equipment from UNRRA arrived only recently and is not yet installed,--with the exception of the one 2000 KW power unit.

7) Without a good repair shop it will probably be impossible to keep the collieries going without loss of production.

8) Since

6) Since the coal production of this mine is too important for China, I would recommend that work on the new coal field should be speeded up as much as possible. The Company should set down the minimum quantities of materials necessary for this purpose and should be helped in this direction.

Respectfully yours,

S. Irons

Copies to: Mr. Chang Kia Ngau,
Mr. Fan Yu Chi
Mr. Fleming Lin C. Lu
Mr. L. C. Yew

(5)

Confidential

The New Dairen Harbour and Improvement-works on the Hai-ho and Taku Bar.

The first plan and preliminary investigations for the construction of the New Dairen Harbour were made in 1927 just before the Lu You Shiao incident by several officials of the South-Manchurian Railway Company. When requested to state my views during an interview, I pointed out then that natural conditions at the sea-coast near Taku were unfavourable for the construction of an artificial harbour and that therefore the cost of construction would be very high. Harbour-dues and shipping taxes could never be collected sufficiently to pay for the amortization of the capital needed for construction. I also mentioned that the amount of rebilting will be great and therefore also the cost of maintenance will be very high. I furthermore mentioned that better results could be obtained in a shorter time with much less expenditure if improvement-works were carried out on Taku Bar and in the Hai-ho. I was thereupon informed that the new harbour will be constructed regardless of its cost and expensive maintenance.

I will hereunder attempt to give the reasons which in my opinion led the Japanese authorities to this decision to construct this expensive harbour:

1. For political reasons. The Japanese wanted a port entirely separate from foreign influence. The limits of the

Treaty-port were carefully studied and according to the wording of the treaty, a harbour north of the bar-channel was considered outside the limits of the port.

2. Strategical reasons may also have played an important role.

3. The cost of construction was greatly under estimated.

4. The amount of resilting and therefore the cost of maintenance also were under estimated by engineers not acquainted with local conditions.

5. The conditions in the Hai-Ho and in the bar-channel were unfavourable for navigation at that time.

As conditions have changed radically following the end of the war a complete review should be made showing if additional huge expenditure on the new Tangku Harbour is under the new conditions justified or if better results could be obtained with much smaller expenditure by improving the Taku Bar and the Hai-Ho.

The original plan of the new harbour provided many wharves and piers for vessels of about 8 m draught.

The greater part of the harbour was reserved for such small draughted coastal steamers chiefly for the export of coal, iron ore and salt from Tangku to Japan.

To construct an artificial harbour at enormous cost for small steamers is a great mistake from an economic point of view as the Tientsin Harbour can be developed at much lower cost. Water-transport is much cheaper than rail-transport. All cargo should therefore be carried by vessels as far inland as possible. Cargo should therefore not be discharged at Tangku in an expensive

harbour but must be carried further inland, up the river to the main post city of Tientsin.

The depth in the Hai-Ho has been improved from 4'30 m at the beginning of 1938 to 4'60 m at the end of 1938. During the period 1939-1947 the depth at Tientsin varied between 4'90 m and 5'20 m. This depth was maintained without any dredging in the navigable channel. A small amount of dredging over a short distance at Tientsin is required to increase the depth to 5'50 m. After completion of the Peku Cutting and Hankai-Cutting a depth of 6'10 m will be maintained without dredging of the fairway. Since the successful solution of the silt-problem by silt-deposition in low lying areas upstream of Tientsin a permanent good depth has been maintained without any maintenance-dredging. The depth of the river downstream of Tientsin increases gradually to 9 m from Hsin-Ho to Tangku and Taku at the river-mouth. This favourable condition for navigation should be used by shipping carrying the cargo up to Tientsin instead of discharging it in the New Tangku Harbour.

The unfavourable conditions of the Taku Bar in 1937 and 1939 were very important factors which contributed to the decision in favour of the new harbour as viewed by engineers not well acquainted with local conditions. The river was badly silted up during the years 1937-1938. During the period 1939-1939 all this silt amounting to 86,000,000 cbm. was washed out by the strong flow, carried downriver and deposited on the bar.

The level of the bar silted up badly and serious loss of

depth occured also in the bar-channel. In 1937 the depth in the bar-channel was for a short time only 5'10 m at Highwater and in 1938 only 5'70 m. In both years the depth was increased to 4 m in December of each year. The depth in the bar-channel was gradually increased in 1940 to 4'60 m, to 5'20 m in 1941 and to 5'30 m in 1942. Before the end of the war and afterwards all dredging was interrupted in the bar-channel and the depth decreased to 4 m. At the end of June 1947 the depth will be increased by dredging to 4'50 m. The general conditions on Taku Bar have greatly improved since 1939. The level of the bar was deepened by the scouring action of the tidal-currents from 0'80 m above Taku Datum in 1939 to 1'50 m below Taku Datum in 1946. This great improvement is bound to continue as the amount of silt admitted into the Hai-Ho and carried out to the Taku Bar is limited now by safe control-measures. The silt-delivery by the tributaries into the Hai-Ho has been greatly reduced since 1937. 10,000,000 cbm. of silt were brought into the Hai-Ho during 1937, 9,000,000 cbm. in 1938, 14,000,000 cbm. in 1939. This huge amount has decreased to less than 1,000,000 cbm. annually during the last few years. This silt- content and the silt-supplied by 3 other tributaries, amounting to about 2-3, 2,000,000 3,000,000 cbm. in a year should be decreased still more to a negligible amount. The dredging and maintaining of a deep bar-channel will become easier year after year as the bar improves. If dredging is continued with 2 dredgers also in July 1947 a depth of 5'50 m will be obtained and maintained already this year.

By means of dredging with the present method using 2 suction-hopper-dredgers a depth of 6'10 m will be achieved in May 1948.

The Taku Bar could be improved still more to a depth of 7'00 m at Average Highwater by constructing one dyke south of the breakwater of the New Tangku Harbour thereby concentrating the tidal-flow within two dykes.

If dredging is continued also after the completion of a south-dyke a depth of 8'50 m could be maintained in the bar-channel, thus most of the vessels which now have to anchor outside Taku Bar could moor safily at Tangku.

These improvement-works could be extended up the Hai-He to Tientsin, because the Hai-He can also be improved for vessels drawing 8 m if the silt-delivery by the 3 tributaries Chao Pai He, Hu Chu He and Chang He is interrupted by means of silt-deposition as is already successfully done in the case of the Yung Ting He. These regulation-works for silt-deposition will also be used for flood-control.

The New Tangku Harbour is economically justified if it is developed for the largest ocean vessels. A harbour at Tangku accessible for large sized ocean vessels would certainly attract more shipping as hitherto especialy in view of the favourable geographical position of Tangku. The size of the hinterland, water and rail transportation are better than for any other North China Port, north of Shanghai.

The development of the New Tangku Harbour, the Taku Bar, the river to Tangku and Hsin-He and the river up to the Tientsin

Harbour should be carried out in such a manner that the trade and shipping will derive the maximum benefit from the expenditure on improvement-work for the above four harbour and river-areas requiring improvement.

A comparision will now be made to show the merits of each separate development, its advantages and disadvantages.

1. The New Tangku Harbour.

The cost of developing that harbour is very high, because of the long dykes required on both sides of the entrance-channel. The maintenance-cost is also high because of the large amount of resilting which is to be expected every year in the extensive harbour areas to be dredged and in the long entrance-channel.

The cost of the maintenance dredging could however be reduced by using special dredgers designed for the special work in the new harbour.

Another disadvantage of the new harbour is the difficulties shipping must expect during the winter on account of ice. Although the ice can be easily broken up by ice-breakers, the removal of the broken up ice sheets is difficult as the current is not sufficiently strong to carry it out sea.

An advantage of the new harbour is that it is seperated from the Hai-He and Taku Bar. Its depth is therefore not subject to frequent variations caused by the varying silt-content in the Hai-He.

2. The development of the Hai-He, Tangku and Tientsin requires the deepening of the channel across Taku Bar. The draught

of vessels in the river is at present limited by the available depth in the bar-channel. The depth at Tientsin is even greater than in the bar-channel. The improvement of the Hai-Ho and Taku Bar must therefore be undertaken in the following manner:

a.) Deepen the bar-channel to 4'90 m. An equal depth is at present available at Tientsin.

b.) Deepen the bar-channel to 5'50 m. Schemes a and b can be made in 1947 by using both suction-dredgers.

c.) Increase the depth at Tientsin Harbour to 5'50 m. by means of dredging. This improvement can be made by the dredging-plant available at present and could be completed in the autumn of 1947.

d.) Deepen the bar-channel to 6'10 m by intensive dredging. Also this improvement can be completed before the end of 1947.

The advantage of the above improvement programs are:

1. Most of the present-day requirements of shipping will be met, as most of the cargo is brought to Tangku or Tientsin by coastal steamers of 18-20 ft draught (5'50 m - 6'10 m).

2. The cost of this improvement is small, as all the required plant is available.

3. No maintenance dredging is required in the river as the current is sufficiently strong to carry the silt downriver and out to sea.

It is more economical to improve the Taku Bar and the Hai-Ho in a short time at a small expenditure than to attempt to maintain at high cost, the new harbour for small vessels.

In the long run it is also preferable to improve the Hai-Ho for a depth of 8 m up to Tientsin even if the cost of improving the long river is higher than the construction-cost of a new harbour. In many instances large expenditure was needed to improve the water-way from an inland port city to the sea. The cheaper port-construction at the river mouth has in most of the cases not been sufficient reason to shift the port from inland to the sea-coast. In the case of Bremen at the river Weser, about 65 km. from the sea, large sums of money were needed to improve a shallow river of only 70 m width at Bremen for ships drawing 8,40 m. An additional port was constructed at the river-mouth for the few ocean-vessels of more draught than 8, 40 m. But most of the money has been used to improve the inland port and a much smaller amount was used for the deep-water port at the river-mouth. Another well-known example of river-improvement is the river Clyde with the port of Glasgow. I was first decided to construct a port near the mouth of the river, because the depth at Glasgow was only 3 ft at spring-tides and it was for some time considered impossible to improve the small river sufficiently to accomodate large vessels. Later on, the port-construction at the river-mouth was given up and the Clyde river was improved with great success. The width of the river at Glasgow was increased from 130 ft to 450 ft and the depth was improved from 3 feet to 30 feet.

Also the river Seine was improved at great expense over a distance of 70 miles, to permit large steamers to reach Rouen. The port at the river-mouth, Le Havre, was developed for the

deep draughted vessels. The Hai-Ho at Tientsin has been improved from a depth of 6 ft, oft to 17 feet and its width at Tientsin has been increased from 220 ft to 325 ft. There is no reason, why the river-width should not be increased to 450 ft and the depth increased to 26 ft at Tientsin. The conditions would permit most of the steamers, which have to anchor now outside Taku Bar to come up to Tientsin.

The same considerations as for the improvement of the Clyde, Seine & Weser hold good also for Tientsin and its port at the river-mouth. Preference should be given to the development of the Hai-Ho and Tientsin, and not to the development of a harbour for shallow draught vessels at Tangku. It must be pointed also that the advantage to the commerce if ocean-going steamers can carry their cargo 60 km into the interior of Hopei to the port of Tientsin will justify the expenditure required for the improvement.

Concluding it may be recalled that conditions in the Hai-Ho and on Taku Bar have greatly improved since 1937 when it was decided to construct the new harbour. The silt-menace has finally been brought under full control and the periodical silting up of the river and bar-channel is now definitely and finally a thing of the past. A fair consideration of both the new Tangku harbour and the Hai-Ho by experienced engineer will unasuhtely reach the conclusion that neglecting the Hai Ho water way in favour of the New Tangku harbour is a mistake.

A. Trollhead

TANGKU NEW HARBOUR.

Attached is copy of Mr. W.E. Price's report on the Tangku New Harbour dated 19/;2/46.

In forwarding this report to our Shanghai Office in December last we made the following comments:-

"Progress. You will notice from the report that a consider-
"able amount of work remains to be done before the final objective
"is reached. In fact, apart from vessels navigating the dredged
"channel through the Harbour in order to pass through the recently
"opened Navigation Lock, the Harbour in its present state is of little
"value to shipping. Progress is being held up by a shortage of both
"funds and materials. Mr. H.C. Wang, the Administrative Chief,
"estimates it will be 4 years before the project is completed and the
"Harbour ready to receive deep draft ocean going ships, but this may
"well prove to be an optimistic estimate. The undertaking is a vast
"one, well conceived on paper, but will require persistence, a large
"amount of money, and technical ability to bring it to fruition."

(1) "Lighterage. At present rate of progress it will be a number
"of years before the New Harbour project is completed and ready to
"receive deep draft ocean going ships. Mr. Wang estimates 4 years, but
"it is possible it may be considerably longer. In the meantime there is
"an idea to bring ocean going ships into the sheltered water between
"the breakwaters, and lighter cargo either to wharfside to railway, or t
"to Tientsin. The success of this depends entirely on ability to keep
"the water clear of silt. "

(2) "The navigation Lock is designed to carry ships of 25ft. draft
"but its ability to do so depends on the amount of water in the dredged
"channel from the Gulf, which at the moment is only 15ft. at high tide.
"After passing through the Lock eventual passage to Tientsin will depend
"on the depth of navigable water in the Haiho river. The maximum at
"high water is 16ft. but it is proposed this shall be increased to 18ft.
"by next Spring and eventually to 20ft.

"Should eventually 25ft. draft ships be able to pass through
"the Lock there will be a greater use for Tongku with transportation
"by rail or lighter to Tientsin. Existing railway facilities are,
"however, quite inadequate, consisting of a single track line only. It
"is the intention to extend them, but in the meantime should it be
"possible to use the Harbour and the Lock to any appreciable extent
"considerable resort would have to be made to lighterage on the Haiho
"River."

NAVIGATION LOCK.

Since the Lock was open and our report written there has been difficulty with re-silting in the Approach Channel to the Navigation Lock. In May M.V. "Cerion" of the Anglo-Saxon Petroleum Co. Ltd., drawing 14ft.5" grounded in the Approach Channel even though according to the New Harbour Administration there should have been at least 18 ft. in the Fairway, and also the depth of water signalled on the Bar Boat was 15ft. The Master of the "Cerion" also noticed a Chinese ship drawing 12ft. stuck in the mud whilst proceeding out of the Lock.

The latest information is that the advertised permissible draft in the Approach Channel and Lock is 17ft., but since there is the same draft expectancy on the Bar, there would not appear to be any benefit gained by ships proceeding through the Lock.

Tientsin
4th August, 1947.

This scheme was started shortly after the Lu Ku Chiao incident in 1937 and was based on what the Japanese considered were political and strategic considerations. Politically it would make the Japanese largely independent of the local Authorities in respect of trade and communications with Tientsin as a port, and strategically it would provide a safe and commodious harbour where ships of deep draft could be worked at all states of the weather, and an entrance to the river at Tongky for ships of much deeper draft than the water available on the Bar would pass.

Briefly, it was intended on completion to consist of:-

(a) A dredged channel from the Gulf leading to a wharf 2,000 feet (700metres) long running East and West for the berthing of ships of a draft up to about 20 feet.

(b) An entrance to the Hai Ho from the dredged channel at a point near the Signal Station. This entrance to the river to be provided with an outer and an inner floating caisson gate about 500 feet apart(160 metres) the purpose of these being to prevent a direct flow of silt-laden water from the Hai Ho entering the New Harbour and causing a heavy deposit of silt, the caissons being withdrawn into chambers in the lock wall to permit the passage of craft.

(c) Two series of parallel ("Finger") wharves, one series running East and West, the other North and South, for the berthing of ocean vessels of draft up to 30ft.

The whole harbour enclosed by a breakwater on the North, a similar breakwater on the South (running parralel with and to the North of the Bar channel) and an entrance breakwater on the East.

It is improbable that such a scheme could be justified on commercial grounds alone, its cost being out of all proportion to the benefits likely to accrue to local trade. The Engineer-in-Chief, Hai Ho Conservancy Commission, illustrates this by stating that in the early stages of the construction of the New Harbour, he estimated that for one percent of the proposed annual expenditure on this scheme he could provide and maintain 15 feet depth below Taku Datum on the Bar Channel, that is 25 feet of water on a ten ft. tide. There is at this present time about 4 feet below Taku Datum on the Bar.

The method proposed was to canalise the outflow of the river by the construction of breakwaters along the Bar and the additional velocity of the water would carry the silt much further into the Gulf.

It is, however, clear that the provision of an enclosed deep water harbour where ocean vessels of up to 30 feet draft can anchor and load or discharge cargo undisturbed by any but the most severe weather, will considerably augment the facilities of the port and encourage trade, providing these facilities can be furnished at a cost not in excess of the probable cost of delays due to bad weather on Taku Bar in present conditions.

The state of the New Harbour scheme at present is approximatley as follows:-

(a) The dredged channel from the Gulf to the Wharf has now a depth of about 10 feet below Taku Datum. Dredging is in progress, two of the Conservancy dredgers being used for the purpose in addition to dredgers provided by the New Harbour Board. The wharf, 2,000 feet long (700 metres) is in existence but only about 600 feet can be used for berthing vessels on accoung of various obstructions. This part (usually referred to as Pier 41) has a depth about 15 at high water.

The presence in the New Harbour of silt consisting of very fine particles, particularly in its upper layers, permits craft to plough through a foot or two of mud, but is likely to give trouble with vessels having condenser water intakes low down on the hull.

(b) The lock is practically complete and dredging is in progress in the short cutting of about 800 feet leading from the lock to the river. The effective length of the lock is 160 metres, the breadth 20 metres and the depth of the sill 5 metres below datum.

The mud level is said to be 3 metres below datum inside and 4 metres below datum outside. From inspection, however, it is clear that the rate of deposit of silt is very high.

(c) The wharves for deep draft ocean vessels are not built. The breakwater to the North is of insufficint height, being covered at high water and, having started from the sea ward end, is under construction for only about half its length; the breakwater to the South is practically complete for 10 kilo-metres of its total final length of 15 kilometres, the uncompleted part being at the seaward end; while the entrance breakwater to the East has not been started.

These breakwaters settle very considerably and will have to be raised in height from time to time over a course of years.

The effect of these breakwaters, when completed, will be not only to protect the harbour from heavy seas but, what is equally important, to exclude most of the silt-laden water of the river outflow from entering the harbour. This latter benefit is not at present obtained. Silting inside the New Harbour is heavy and rapid. Being loess of very fine particles it is possible that some method of removing it more expeditiously and economically than by the existing available methods will be devised and embodied in new dredgers. This, it is understood, is under consideration.

These are six dredgers being employed at present, two suction hopper dredgers on loan from the Hai Ho Conservancy, two bucket dredgers and two electric radial suction and pump dredgers, the property of the New Harbour.

It is the opinion of the American Dredging expert, Mr. Proctc at present here on loan from U.N.R.R.A. that to deal effectively with the immense problem of silt deposit within the New Harbour area, it will be necessary to use at least two new suction dredgers, each capable of dealing with one million cubic yards a month and of about 5,000 H.P. He is also of the opinion that if the breakwaters were completed (the expense, of course would be extremely high) there would be a negligible deposit of silt within the harbour. At the moment the situation bears some resemblance to that facing Mrs. Partington and her mop.

The silt dredged is being pumped to form a reclamation to the North and West of "Pier 41" and this reclamation is now of considerable extent. It is served by railway sidings connected by a single line with Tongku Station. This single line, at one point, croses C.N.Co./T.L.Co.property at Tongku. The construction of light godowns near "Pier 41" is in hand.

There is a dockyard near the lock provided with machine shops, a pattern shop and foundry, forges, and a small sawmill. The buildings are of brick walls with timber roofs. All are of Japanese construction. Power comes from the grid system.

There is a slipway leading into the river near the Quarantine Station and this is capable of handling craft of about 100 tons. It is proposed to move this slipway into the New Harbour. The operation of the lock caissons is intended to be by electric power. Hand operating gear is, however, installed.

The Tientsin City reach of the Hai Ho is at present limited to about 16 feet at high water though it is expected that by the late Spring of 1947 the Conservancy will have obtained 18 fee t. Thus, on paper, ships of 18 feet draft will shortly be able to enter the river at Tongku and in the course of 1947 will be able to procee d up to Tientsin.

Certain difficulties in the operation of the lock scheme are likely to be encountered in respect of ice, silt, and navigation. Ice is likely to be carried down the river into the entrance to the lock and when the outer caisson is withdrawn, into the lock area itself. It may be sufficient to cause a jam, The still water in the lock will free ze very readily. Similarly, there is likely to be a rapid accretion of silt in the 800 feet channel from the river to the lock - how rapid, only those familiar with the peculiar Hai Ho conditions can appreciate. A deposit of several feet may occur within a few days. A vess el of several hundred feet length entering the river stream at an angle from the lock approach will be liable to sheer. It is probable that the use of a tug will be necessary. It is possible that with experience these difficulties will be found to be capable of solution.

Though the effect of the completion of parts (a) and (b) of the scheme to the point where ships of 18 fee t or perhaps 20 feet draft can enter the river and possibly proceed to Tientsin could prove beneficial to the trade of the Port, it appears probable that the application of less energy and capital expenditure to the problems of the Taku Bar could produce equally satisfacoty results without the risk that the principal life line of Tientsin commerce were the Bar maintenance to be finally curtailed in favour of the New Harbour, could be neatly guillotined at the New Harbour Lock .

The problems of Taku Bar do not of course start at the Bar - they start in the loess deposits of the hinterland. The trapping and settling of the silt above Tientsin is, probably, the best long term scheme.

(sgd). W.E Price
19/12/46.

CHINA COAST SHIPPING

The future position of foreign shipping on the China coast is at present the subject of discussion in Nanking, where the trade treaty between the British and Chinese Governments, which will include terms of navigational rights on the China coast, is now being negotiated.

As far as Tientsin itself is concerned, there are in particular three trades now lost to foreign shipping, in which they participated before the last war:-

1. Tientsin/Canton

   In prewar years there was a considerable trade between this Port and Canton in which foreign shipping played a part. As a result of the 1943 Treaty this trade by foreign flag ships has been discontinued, apart from a small amount which is transhipped at Hongkong, with the consequent additional expense and inconvenience to the Chinese shippers. Cargoes were largely Beans, Groundnut Kernels and Medicines.

2. Tientsin/Swatow Charters.

   Also before the last war, in order to assist shippers of low priced cargo, such as Beans, Bean Cake and Salt Vegetables, to Swatow, special charter parties were drawn up at greatly reduced freight rates by foreign shipping companies. Such business is of course no longer possible.

3. Salt, Cement, Soda Ash.

   Large quantities of these commodities are produced in the area of Tangku and in prewar days, foreign shipping carried a majority of these shipments to Shanghai and Yangtse River ports thus again assisting in China's economic development.

As far as 1 and 2 are concerned, it does not appear that Chinese shipping companies are catering for this traffic for which there is still a demand for shipping space, the reason may possibly be found either in the lack of sufficient Chinese tonnage, or in a failure to co-ordinate the Chinese coastal service available. Certain quantities of the items mentioned in 3 are being shipped but it is believed not in the full quantities available.

Tientsin

4th August, 1947.

Whilst later in this memorandum considerable stress is laid on the inadequacy of the China Merchants', and other small Chinese commercially owned Tug and Lighter Companies, for efficient and quick handling of ocean shipping at Taku Bar, the T.L. Co.'s case also rests on the right to be allowed to operate under the existing regulations of the National Government of China.

The present argument with the Navigation Bureau, who are controlled by the Ministry of Communications, is whether the T.L.Co. is operating in "Inland Waters" - which right for Foreign Flag shipping was surrendered by the Treaties of 1943 - or within "Harbour Limits". The Navigation Bureau argue Taku Bar/Tientsin is "Inland Navigation" whilst the T.L.Co.'s contention is that they are operating within "Harbour Limits" and in this the T.L. Co. are fully upheld by the Chinese Maritime Customs who are under the jurisdiction of a separate Ministry, viz, the Ministry of Finance. Control of Harbours comes under the Customs and is jealously guarded by them. The Harbour limits of Tientsin are clearly defined as "From the ex-Austrian Bridge to a point three miles to the eastward of the twelve-foot contour of the Taku Bar", and with slight alterations this has been the case since 1867. The Inspector General of the Customs, Mr. L.K. Little, has it is understood a ruling from the Executive Yuan that as a temporary measure anyway Foreign Flag Tugs and Lighters are permitted to operate within the Harbour Limits of Open Ports as hitherto.

According to the regulations Tugs must obtain certificates of survey from the Navigation Bureau before the Customs are permitted to issue registration certificates. This ruling, however, applies to Tugs only and not Lighters which latter craft may be registered with the Customs without Navigation Bureau Certificates of Survey. Obviously though Lighters, which are not self propelled, are of no value unless there are Tugs registered to tow them. The Tientsin Lighter Co. has Customs Registration Certificates valid for one year from March 1947 unless revoked in the meantime, and as a result of the very serious lighterage crisis which occurred in December last, of which the American Consulate General is fully aware, and when American shipowners

were seriously considering omitting Taku Bar as a port of call owing to the undue delay in despatch at the Bar - On occasions as much as 3/4 weeks - the Navigation Bureau were instructed by the Ministry of Communications to grant the T.L. Co. temporary Certificates of Survey until 30/6/47. It is these Certificates of Survey which the Navigation Bureau are now refusing to renew on the grounds that the T.L.Co. is operating in "Inland Waters" which according to them is an infringment of China's "Navigation Sovereignity" and they have told the T.L. Co. they are therefore to cease running. As stated above the Customs fully uphold the T.L.Co. and state they are permitted to opera te unless the Inspector General rules otherwise and this he would not do unless specifically instructed to do so by the Executive Yuan through the Ministry of Finance.

The Navigation Bureau's Certificates are for seaworthiness only and should not be withheld if T.L. Co.'s craft conform to the required standard which in effect they do. Thereafter granting of a licence for actual operation within Harbour Limits is in the hands of the Customs.

Irrespective of the "Inland Navigation"/"Harbour Limit" controversy another aspect is that if Foreign Flag overseas shipping is allowed to call at Tientsin, but is forced by local conditions to discharge cargo destined for Tientsin at Taku Bar, then it is only equitable that the voyage should be "continued" and finally completed by Foreign Flag Tugs & Lighters.

Adequacy of Tonnage. In pre war days Lighterage at Taku Bar/Tangku/Tientsin was almost entirely in the hands of:-

1. The Taku Tug & Lighter Co. which was sold to Japanese interests.
2. The Tientsin Navigation Co. a Chinese concern
3. The Tientsin Lighter Co.

At the present moment in addition to the Tientsin Lighter Co., the China Merchants are operating the former Japanese owned Taku Tug and Lighter Co. fleet and there are a few commercially owned Lighters running. A new Company, the Po Hai Navigation Co. has been formed to take the place of the former Tientsin Navigation Co. but although they

are said to be expecting 7 lighters and 3 tugs from Shanghai these have not as yet arrived. If therefore the Tientsin Lighter Co. is forced to close down there will be a virtual monopoly of Lighters by the China Merchants, which is a State owned enterprise. Whilst there are arguments for and against Govt. monopolies it is submitted that in this particular instance, when China is attempting to expand both her export trade and her communication systems, for which Foreign help is needed, such a monopoly would be prejudicial to her own interests. It should also be remembered that the China Merchants run their own fleet of coastal vessels, which owing to the nature of the Bar and the Haiho River, constantly require lightening and there may therefore be a tendency to give their own vessels priority to the detriment of Foreign Flag overseas shipping.

Attached is a list of Tugs and Lighters presently available at this Port. It is submitted these would be inadequate to give a quick despatch at the Bar unless the T.L. Co. is allowed to continue running and there would again be unjustifiable delay to foreign overseas shipping at the Bar. This delay would obviously be a further obstacle to the other numerous ones stifling foreign trade in this country and furthermore would be a definite impediment to the economic recovery and rehabilitation of North China with its vast hinterland. There is no need here to stress the very considerable volume of overseas imports and exports which in normal times passed through Tientsin. Under present conditions trading is restricted but the following statistics of tonnages handled by the T.L. Co. during the period Jan/June 1947 may be of interest:-

Overseas Vessels (mainly American)	63,679
Chinese vessels	25,643
Agency vessels	1,237
U.S.M.C. vessels.	21,222
River Lighterage	4,757
Total:	116,538 Tons.

or close on 20,000 tons per month giving almost full and continuous employment to the T.L. Co. fleet and it is certain this

could not have been handled by competitive Lighterage Cos. without causing delay to the overseas carriers. Present conditions cannot continue indefinitely and as the volume begins to increase so the need for the Tientsin Lighter Co. to continue will become even more apparent than it is now if cargoes are to be efficiently and speedily handled, particularly in the winter time with icing at the Bar when turn round of Lighters is adversely affected. Lighterage is a facility that must always be available in a Port like Tientsin and a Company must always have its services immediately available whatever the current tonnage offering may be, if prompt and satisfactory service is to be given.

Type of Craft. Lighterage at Taku Bar takes place in an open roadstead subject to heavy weather and in winter bad icing conditions. It therefore requires a very specialised type of Tug and Lighter, and also knowledge of local operating conditions. Over a period of almost 50 years the T.L. Co. has developed craft suitable for work at the Bar and in the river, and also employs specially trained engineers and qualified men for Bar Overseeing. and other work. The China Merchants are fortunate in that they become possessors of the Taku Tug & Lighter Co.'s craft which were specially built for service here, but they and other Chinese commercial Lighterage Co.'s have found it impossible to augment their facilities with suitable craft. New Building is out of the question at the moment on the grounds of cost. Attempts have been made to utilise UNRRA Barges and Tugs but these for various reasons are quite unsuitable for local conditions. If therefore the T.L. Co. is forced to close down 3 specialised Tugs and 14 Lighters will be unavailable for the Ports needs.

Pilferage on lighters between the Bar and Tientsin has become heavy under present conditions . The Tientsin Lighter Co. has been paying particular attention to this hazard and has brought into use new hatch locking devices which it is claimed have gone a long way to eradicate this evil from its lighters.

New Harbour. One argument in the attempt to drive the T.L. Co. out of business is that development of the New Harbour will considerably reduce the need for lighterage, but this is a scheme which will take many years, if ever, before it is fulfilled.

The American Consulate doubtless has full information on the New Harbour project but attached are a few notes in case they are of any value.

Tientsin,

4th August, 1947.

File No.

Name:

Address:

Date: From 19 to 19

Reference

MISCELLANEOUS ECONOMIC DATA * MANCHURIA

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(I) RAILWAYS

I. RAILWAYS IN OPERATION SOUTH OF THE GREAT WALL ON 7 JULY,1937 (See Railway Map No. 1):

LOCATION	KILOMETERS
North China, North of but not including the Lunghai Railway	5,185
South and Central China, including the Lunghai Railway	6,419
TOTAL	11,604

II. RAILWAYS ON V-J DAY (See Railway Map No. 2):

LOCATION	KILOMETERS IN OPERATION	KILOMETERS NOT IN OPERATION	TOTAL
North China	4,472	1,277	5,749
Central & South China	4,300	4,537	8,837
TOTAL	8,772	5,814	14,586

It is estimated that the total kilometrage of railways in Manchuria was about 11,336 on V-J Day, but no definite information was available on account of the Russian military activities.

III. COMMUNIST DESTRUCTION FROM V-J DAY TO 26 JULY, 1947 (See Railway Map No. 3):

Manchuria	destroyed	1,909 Kilometers
North China	destroyed	2,967 Kilometers
Central China	destroyed	682 Kilometers
TOTAL		5,558 Kilometers

Most of the destruction in Central China was along the Lunghai Railway.

IV. GOVERNMENT RESTORATION FROM V-J DAY TO 26 JULY, 1947 (See Railway Map No. 4):

Manchuria	3,526 Kilometers
North China	1,452 Kilometers
South & Central China	2,364 Kilometers
TOTAL	7,342 Kilometers

The above total figure includes both the Japanese and communist destroyed lines and some of the restored lines have again been destroyed by the communists.

V. PRESENT CONDITION JULY 1947 (See Railway Map No. 5):

LOCATION	TOTAL KILOMETERS	KILOMETERS IN OPERATION	KILOMETERS NOT IN OPERATION
Manchuria	11,336	1,647	9,689
North China	5,749	2,362	3,387
South & Central China	8,837	6,199	2,638
Taiwan	3,925	3,925	----
Hainan Island	289	---	289
TOTAL	30,136	14,133	16,003

VI. PLAN FOR THE NEAR FUTURE (See Railway Map No. 6):

a. So far as railroads are concerned, China south of the Great Wall may be divided into two areas with the Lunghai Railway as the demarcation line. The area, roughly bounded by Peiping-Suiyuan Line and Peiping-Tientsin-Shanhaikwan Line on the north and Lunghai Line (not including Lunghai) on the south may be designated as the "Military Area." In this area, the main problem is to maintain the operation of Peiping-Suiyuan Line, the Peiping-Tientsin Line and the Tientsin-Mukden Line. Any definite detailed restoration plan for the other lines in this area is not feasible. We succeeded however, in restoring the Tsingtao-Tsinan Line on December 12, 1946, which was again destroyed after 60 days of operation. We were also able to maintain regular traffic between Peiping Paoting, Shihchiachuang and Taiyuan for a long time. The Paoting-Shihchiachuang Section was destroyed on September 29, 1946, and Shihchiachuang-Taiyuan Line destroyed on April 14, 1947. At present we are barely able to maintain improvised traffic between Peiping and Paoting. Our general plan aims at restoring the northern section of the Tientsin-Pukow Line. We are now pushing northward fro Hsuchow in the direction of Tsinan. The status of the restoration work is indicated on Railway Map No. 4.

The almost daily destruction of the railroads by the communists in this area makes it necessary to maintain a reserve pool of railway materials to meet all emergencie We are working at present on a procurement plan.

b. (1) The area south of and including Lunghai Railway may be designated as the "Rehabilitation and Reconstruction Area." This is the area where we intend to concentrate efforts

The Lunghai Line, until recently, was considered as a part of North China. With the change of the course of the Yellow River it should now be considered as a part of Central and South China.

(2) The restoration work in Central and South China is Scheduled to be completed in three phases:

(a) Phase 1 will be devoted to the rapid opening of all railroads by any and all improvised means at our disposal.

(b) Phase 2 will be devoted to restoration of the pre-war standards.

(c) Phase 3 will initiate modernization of the railroads to a minimum world standard.

The following table gives planned phasing of the various railroads in Central and South China by year:

NAME OF RAILROAD	PHASES OF IMPROVEMENT BY YEAR		
	1947	1948	1949
Lunghai Line	2	2	3
Peiping-Hankow Line Chengchow-Hankow Section	2	2	3
Tientsin-Pukow Line Hsuchow-Pukow Section	2	2	3
Nanking-Shanghai-Hangchow Lines	3	3	3
Chekiang-Kiangsi Line	1	1	2
Canton-Hankow Line	2	2	3
Hunan-Kwangsi-Kweichow Line	1	1	2

(1) The Canton-Hankow Railway, restored for operation on 1 July, 1946, provides a vital connecting link between the Yangtze and the Pearl River. Its southward traffic from the upper and central Yangtze Valley consists of rice, cotton, piece-goods for domestic use and woodoil, bistles, hides, eggs, ramie, antimony and wolfram for exports. Its northward traffic from Canton and Hongkong is made up of salt, sugar, machineries and manufactured goods. Since the repair work of this railroad was hurriedly completed in a period of six months, this line has all the characteristics of an improvised railway. The rails are of various weights and sections (Varying from 60 lbs. to 110 lbs.) Sleepers are of native soft wood with a life of from one to two years. Many of the bridges are temporary wooden structures which are liable to be washed away by flood. With the exception of 44 new locomotives from UNRRA, most of the locomotives and cars are in deplorable condition.

There is a general lack of repair materials and shop machineries and they are not available in China. In view of the general economic importance of the Canton-Hankow Railway and the ever-increasing traffic demands, it is extremely urgent that all these defects be remedied at an early date.

(2) The Chekiang-Kiangsi Railway, from the view point of its economic value, is as important as the Canton-Hankow Railway. Its principal incoming and outgoing freight traffic consists of rice, chinaware, ramie, grass-cloth, paper, salt, cotton, cotton goods, machineries etc. Large deposits of bituminous coal, wolffram, tin and antimony in Hunan and Kiangsi provinces will also constitute a considerable share of the freight traffic. During its five years of operation from 1936 to 1942, this railway had a well balanced long haul traffic. When restored to operation, this line will link up the Canton-Hankow Line with the Shanghai-Hangchow Line and thus facilitate the economic rehabilitation and development south of the Yangtze.

(3) Nanking-Shanghai-Hangchow Line is the busiest line in the whole area. During the past year and half, it has in many respects been brought to pre-war standard. But it is still far from being able to meet the demand of the ever-increasing traffic. We plan to modernize it in the immediate future. The economic and political importance of this line is self-evident.

(4) Hunan-Kwangsi-Kweichow Line which can be considered as an extension of the Chekiang-Kiangsi Line will be restored from Hengyang to Kinchenkiang, a town 160 kilometers west of Liuchow, by the end of 1947. But this merely means improvised opening of traffic. We plan to bring it to such a standard late in 1948 as to enable it to handle the traffic of a normal railroad.

(5) Lunghai Line, Tientsin-Pukow Line (Southern Section) and Peiping-Hankow Line (Southern Section):

These three lines are the main economic arteries of Central China. They must be brought up to prewar standard at an early date to handle the tremendous volume of traffic in this area.

(6) Yellow River Bridge of the Peiping-Hankow Line:

The present bridge is only a temporary structure and is now in a most precarious condition. We plan, therefore, to start building a new bridge as soon as possible. The design has been completed by the International Engineering Company, San Francisco, U.S.A.

(7) Replenishment of Locomotives and Rolling Stock in the "Rehabilitation and Reconstruction Area."

The locomotives and rolling stock of the various lines in the Central and South China were removed to West China when we retreated during the war. Most of them were eventually destroyed at the last stage of the war. What the Japanese had brought in to this area from Manchuria are far from being sufficient to meet the present need. So far the only available addition to our locomotive and rolling stock pool has been 147 locomotives and 3445 used freight cars from UNRRA, and 50 second-hand passenger coaches purchased from U.S.A. Our present plan is to procure at least 75 more locomotives and 1500 freight cars, and, if possible, some second-hand passenger coaches to replenish the lines in Central and South China.

(8) Shop Machineries and Repairing Materials for the Rolling Stock.

The existing rolling stock is, in general and with very few exceptions, in deplorable condition due to lack of repairing and maintenance materials and facilities. It is necessary to secure a sufficient quantity of various kinds of shop machineries, repairing materials and spare parts from abroad to be distributed to the above mentioned lines.

(9) Signal Equipment.

This is an essential item of the rehabilitation work. On account of its great importance in ensuring traffic safety, the early procurement of the required signal equipment is vital desideratum.

(XI) HIGHWAYS

I. INTRODUCTION

(1) It is extremely difficult to approach any discussion regarding Chinese highways without a short summary of conditions that obtained prior to and during the war. Before 1932 motor roads in China were, for all intents and purposes, limited to the areas adjacent to the coastal metropolitan regions. In that year a Highway Depart ent was organized under the National Economic Council and an inter-provincial highway construction program was established and promulgated under that department with so much effort that by 7 July 1937 more than 109,000 kilometers of roads had been constructed out of which 43,000 kilometers had all-weather surfaces of either gravel or waterbound macadam.

(2) During the war, with the advance of the Japanese Army, many of these roads were destroyed for tactical reasons or abandoned. Others were destoyed by Chinese units operating in the rear of the enemy. In West China, many kilos of old roads were rebuilt and many more newly constructed in order that military traffic could be expedited. At that period there were less than 600 kilometers of operable railways left in the hands of the Chinese Government, and with the exception of the Yangtze River and a few of its major tributaries no large quantities of freight could be moved by water. Highways were an absolute necessity for the movement of heavy cargo in "Free" China at that time just as they are needed now to meet the needs of rehabilitation and reconstruction. At the end of hostilities 49,589 kilometers of all-weather highways were in operation in "Free" China, and in very good condition. By this same date 76,686 kilometers of roads of various types had been destroyed.

(3) The greatest destruction of highways took place in what might be termed the main combat zone. This zone was several hundred kilometers in width and extended entirely across China from North to south along the general line: Loyang (east of Sian) - Kweilin - Nanning. At the end of the war rapid troop movements were urgent in order to take over areas from the Japanese. To accomplish this 4,016 kilometers of roads were restored in this combat zone within a period of several months. Later some 4,189 kilometers of additional highways were restored to meet the needs of relief and rehabilitation work. To date it has been impossible to restore more that 20,513 kilometers of the 76,686 kilometers destroyed during the war. This leaves 56,173 kilometers of highways without any restoration work having been done on them. Even on those roads that have been restored the work is such that the majority are only passable for motor vehicles in good weather, bridges are narrow and the right-of-way is not generally satisfactory.

Three factors have been the principal cause of this serious conditions: (a) the chaotic situation caused by the Communist defection: (b) the shortage of sufficient funds for foreign exchange for the purchase of supplies needed from abroad: and (c) the failure of rehabilitation agencies to make effective more than a small percentage of the planned assistance for communications. This is briefly and generally the picture of the present status of the highways in China.

II. URGENCY FOR THE RAPID RECONSTRUCTION OF GOOD ALL-WEATHER HIGHWAYS

(1) From an economic viewpoint China can be divided into three general areas for discussion as to needs for highways for the next several years as follows:

(See Attached Map No. 1)

a. The Northeastern region, which may be referred to as the Military Area.

b. The Northwestern region and the Southwestern region, to be referred to as the Maintenance Area.

c. The South and Southeastern region to be referred to as the Rehabilitation Area.

(2) The Military Area includes Northeast China south to the Lunghai Railway as far west as Sian. At Sian the western border runs in a northwesterly direction. This is an extremely productive area and necessary for the complete recovery of China. However, due to the Communist rebellion and military operations in this area, no extensive highway reconstruction is contemplated by this Ministry until the situation is clarified. When this territory is free of these elements , road reconstruction must start immediately in order to make accessible the rich coal and mineral deposits and agricultural products to the rest of China and to the World.

(3) (a) The Maintenance Area: This region includes all of Northwest and Southwest China west of a line from the Liuchow Peninsula thru Changteh to Sian and the western border of the Military Area. There are 49,569 kilometers of highways in this area most of which were constructed during the war for the movement of military traffic. The remainder was reconstructed within a few months after the conslusion of the war to handle troop movements into the reoccupied parts of China. All of these roads were and are now in fair operable condition. The majority of the roads have all-weather surfaces of various types and widths, but cannot in any sense of the word be considered as high type highways as the surfaces are all gravel or broken rock with only soil binders. In many cases, the

bridges are narrow and limited as to weight loading, as satisfactory materials were not available at the time of their construction, also the time element was a great factor when they were built. Furthermore, a large percentage of the roads traverses terrain that is very mountainous and are subjected constantly to heavy mountain rains. This offers a very serious problem in drainage. Continuous maintenance is absolutely necessary to keep these roads passable. It is the intention of this Ministry to spend only that amount absolutely necessary to keep these roads in a good passable condition at this time. This will require constant and intelligent maintenance with the minimum of minor repairs. At a late date large sums of money must necessarily be expended on these highways as eventually it will become uneconomical to maintain roads of this type when subjected to heavy traffic.

(b) From an economic standpoint it is believed that these highways must be kept passable for motor vehicles for many reasons.

First: All other means of transportation in this area are extremely limited. The only rail lines serving this entire region now are the meter-gauge line running south and east thru Kunming with a total of trackage of about 600 kilometers, and the western end of the Lunghai Railway from Sian to Tienshu which is standard gauge with a distance of 328 kilometers. Water transportation is nearly as restricted as the rail transportation, with only the Pearl or West River navigable to any great extent as far west as Nanning in the South. Westcentral China is some what better off as it has the Yangtze River reasonably navigable as far west as Ipin. Several of the larger tributaries of the Yangtze River are suitable for fairly large junks at the right periods of the year. However, the entire north and northwest section has only trucks to depend on for economical transportation, as no rail or water facilities are present. These conditions will exist for at least several years.

Second: Some of China's richest provinces are situated in this area, Szechwan is probably the richest province in China, it is one of t e greatest in the production of food and is about the only source of salt in the west. These products must be moved to the south for use of the poor areas in Kweichow and Kwangsi and to the north and northwest which is arid and cold. The movement of cotton, wool and hides from th northern areas is essential to the economy of all China, as well as to other region in this area and to the world at large.

(4) The Rehabilitation Area (See Map No. 2)

(a) This area includes the remainder of China which is the south and southeastern region laying to the south of the Lunghai Railway. It is very thickly populated and has the major portion of modern industry located within its boundry. It also includes the great rice producing areas around Tung Ting Lake and Poyang Lake, as well as vital coal and mineral deposits.

(b) A quick look at a map would seemingly indicate more

transportation facilities here than in any other section of China. A close study soon corrects this idea. While the Lunghai Railway is along the northern border and the Canton-Hankow Railway and part of the Peiping-Hankow Railway are along or near the western border, it must be borne in mind that these rail lines are not and can not operate nearly to pre-war standards for sometime to come. The rail lines on the west were completely demolished during the war and have had only very limited assistance in being rehabilitated with meager, temporary structures and equipment. Other railroads were destroyed or dismantled during the war and will not be operable to any great extent for a minimum of two years and then only with outside help for the purchase of supplies that must be obtained from foreign sources. The Nanking-Shanghai Railway and the Shanghai-Hangchow Railway were the only exceptions and are in fair condition but serve only a very small area. Water transportation is available up the Yangtze River and in the vicinity of Canton only, as the rivers leading into and from the lake areas are of no special value for reliable operation. The above has been pointed out to show the vital necessity for highway construction and reconstruction in this zone. Even with the reconstruction of all the pre-war railways to a high operating standard large areas will be totally without any modern means of transportation unless good roads are made available.

(c) From an economic and humanitarian point of view the region south of the Yangtze River is most critical and important, for here are located the rice producing lake areas. It is urgent to be able to get rice out rapidly to other famine sections when needed. This rice region is also subjected at times to serious floods necessitating the movement of food into this area and to other areas to the south and west, as has been the case for the last two years. Even after the complete reconstruction of the Chekiang-Kiangsi Railway is an accomplished fact the whole of southeastern China south of this rail line and east of the Canton-Hankow Railway will be completely dependent on motor truck transportation for a number of years. Without suitable all-weather roads a large area will be isolated. In this area are located mineral deposits of fine coal, wolfram and tin, all of which are needed for economic recovery. In addition, this region has agricultural products in quantity, such as ramie, tung or wood oil, grass cloth and many other items of importance to move to the coastal ports or to railheads and inland water ports. The traffic from the ports to the interior will consist mainly of salt, manufactured goods and machines for industrial improvement. This coastal region is the only source of salt for this part of China. Between Shanghai and Canton there are four good seaports, namely Wenchow, Foochow, Amoy and Swatow. These ports are at

present almost wholly cut off from the inland towns and cities, except in their immediate vicinity, because no transportation exist other than carts and man-packing. Improvement of transportation from these ports inland to connect with inland rail and water lines would greatly improve conditions locally and nationally.

(d) Most of the roads in this region are in very bad conditions as they were off of the lines of the main Japanese Army movements and have had very little care of maintenance during the war and cannot be satisfactorily reconstructed without obtaining large quantities of supplies from abroad, as they are not available in China. Increasing the difficulty is the fact that this area never had sufficient good roads for motor operation.

(e) In order to meet the most urgent and critical needs for highways in this area, it is believed that the minimum requirements for road improvement are as follows: (Ref. Map No. 2)

(1) Roads for restoration or reconstruction marked in brown on the map ..... 5,415 Kilos.

(2) Roads to be newly constructed to connect existing roads and centers of communications, marked in green on the map ..... 864 Kilos.

(3) Roads to be restored, marked yellow... 1,584 Kilos.

(4) Roads serviceable but in need of further improvement, marked in blue on the map ..... 2,822 Kilos.

Total kilometers in all categories ... 9,685 Kilos.

To achieve the program listed above within a reasonable space of time will require considerable foreign financial aid for items (1) and (2) and some assistance for items (3) and (4). The assistance necessary is only for supplies and materials which must be purchased abroad and delivered to a Chinese port. This is necessary because these supplies and materials are not available in China and because of the very unfavorable rate of exchange with no gold balance to defray the costs.

III. OPERATION OF MOTOR TRANSPORTATION:

(1) At the conclusion of the war there were available approximately 60,000 motor trucks for all civilian operation. But this figure is very deceiving as the majority were of a vintage of from 1938 to 1942 and had been put to very hard service during the war in West China. They had been converted to operate on charcoal or alcohol which is very hard on motors. Furthermore, spare parts and repair shops and suitable metals were so scarce that the trucks were necessarily abused, as the military situation required maximum operation. At the present time less than half of these trucks are operable or repairable. Others are inactivated because of the shortage of tires and replacement parts which are unobtainable in China.

(2) The Transportation Department of the Highway Administration now has 5,583 motor trucks of which 50% or 2,761 are now inoperable and beyond repair. These will be cannabalized and junked. The immediate need for trucks for augmentation and for replacement of part of those now in operation with the next six months will be between 4,500 and 5,000 units. In addition, fuel, lubricants, tires, spare parts, shops and shop tools and stocks of metals of various categories for the machining of parts will be needed. None of the above are available in China and must be obtained from foreign sources abroad. It is impractical and uneconomical to obtain trucks without sufficient tires, parts and other operating necessities available because with the source of supply so far away great loss in operating revenue is suffered. It is estimated that the cost in U.S. dollars would be about $25,000,000 to bring truck operation to minimum required standard.

IV. SUMMARY

(1) The plan outlined above has been made to meet the situation now confronting China after taken into account her financial and economic condition, and is believed to be the very minimum required to improve these conditions. Any further reduction in these planned improvements or any long delay in their promulgation could be disastrous.

(2) No large expenditure of money is to be made by this Ministry where Communist disturbances exist.

(3) In the area of Southwest and Northwest China money will only be expended for maintenance and minor repairs to keep the roads in their present condition, which is approximately the same now as on V-J Day.

(4) No attempt will be made to place highways up or near to United States standards at this time as it is felt that for

the present lower standards with good all-weather surfaces will be the most economical, and will service for the present.

(5) Highway improvements will initially and generally be made where they do not parallel other means of transportation.

(6) Highways will initially be improved and constructed to act as feeder lines to railheads, and inland and coastal ports.

(7) The requirements for motor trucks have been placed very low. When all the roads in existence before the war and those built during the war are reconstructed the density of trucks operated by the National Highway Administration will be approximately only one truck for every 21 kilometers of highway. This is estimated on the basis that 6,000 trucks will be in use at that time by the Highway Administration.

(8) Request for foreign assistance has been limited, in general, to those items of equipment, repair parts, supplies and materials that are not now or will be available in China for sometime to come.

(9) Due to the size of China and to the dispersion and deversification of her resources, no marked improvement in her condition can be expected until the minimum requirements in transportation have been achieved. Good highways with the resultant motor traffic is one of the most important as this type of transportation can reach every section of the country. Without motor transportation all other means of transportation are seriously handicapped. Each type is indispensible to each other in their individual economy and to the economy of the nation as a whole.

(III) CIVIL AVIATION

I. CONDITION BEFORE AND DURING THE WAR.

Before the War, there were in China three airlines, two under government supervision, the China National Aviation Corporation (CNAC), the Eurasia Aviation Corporation (EAC), and one of private management, the South-West Aviation Corporation (SWAC), operating over routes of 7,500 miles. All these three corporations had very few planes and inadequate ground and communications equipment. Chinese civil aviation was still in the stage of infancy before the War.

With planes, equipment, and offices badly damaged by the Japanese, the SWAC ceased operation at the beginning of the War, and the EAC was reorganized into the Central Air Transport Corporation (CATC) under the direct control of the Ministry of Communications. CNAC was considerably expanded during the War. It made notable contribution to the "over hump tonage" and maintained regular service between the principal cities in free China. CNAC had a brilliant war record.

II. CONDITION SINCE V.J.DAY.

After V-J Day, great efforts have been made to restore and to improve air service in China. Up to the present, the two Corporations CNAC and CATC are operating with a total of 83 planes over 45 routes of 47,932 miles.

These 83 planes, however, are mostly of C46 and C47 types bought from the American surplus liquidation agencies and, due to the critical shortage of spare parts, not more than 45 of the 83 aircrafts are in actual operation.

Aside from the above-mentioned Corporations, there is the CNRRA Air Transport (CAT), which is organized under a contract with the China Relief and Rehabilitation Administration (CNRRA). It is operating with 19 planes on non-scheduled flights, carrying principally rehabilitation goods and government cargo.

The Ministry of Communications, realizing the importance of civil aviation in relation to China's reconstruction and development, established the Civil Aeronautics Administration on January 20, 1947, which is somewhat similar in organization to the CAA of the United States.

III. PLAN FOR THE NEAR FUTURE.

The newly established CAA embarked on an 18-month program as an immediate remedial measure to improve the present inadequate civil air services in China. Briefly stated, the 18-month program consists of the following:

1. Aerodrome Construction - The following aerodromes are to be completed before July 1st, 1948:

Three B-Class International Airfields-
Shanghai, Tientsin, Canton.

Two Alternate Airfields-
Amoy, Taipeh.

Three Auxiliary Airfields-
Swatow, Foochow, Haikow.

Two-B-Class Domestic Airfields-
Nanking, Hankow.

One D-Class Domestic Airfield-
Kiukiang.

Most of the planned work is under construction. The 6,000 feet runway of Lunghwa airfield and 4,000 feet runway of Kiukiang have been completed.

2. Air Traffic Control and Meteorological Services.

Eight air traffic control areas have been designated in China, each area being under the control of an air traffic center. The air traffic control center in Shanghai, which is the first one to be established, is now being set up. Twelve major civil airports are to have control towers. One central meteorological observatory at Nanking, nine district meteorological observatories to be located at Shanghai, Amoy, Canton, Hankow, Tientsin, Mukden, Kunming, Chungking, and Sian, and forty-five meteorological stations at the various civil airfields will be established within one year.

3. Aeronautical Communications Network.

Basing upon ICAO standards, a minimum required network has been designated by CAA to handle

air-ground communications and point to point aeronautical service. A total number of eighty (80) stations are required. Due to the lack of equipment, it is planned only to complete stations at 18 airfields within eighteen months.

4. Navigational Facilities.

Additional LF/MF transmitters of 1-3 KW are to be established at eighteen aerodromes. Most of the transmitters will be installed on the extension line of the runway for let-down and instrument approach. The homing equipment already available in China (400W-750W) will be partly used as stand-by units and the rest will remain at airports with comparatively less traffic density.

In view of the fact that radio range stations are quite expensive and likely to be replaced by VHF equipment in the near future, and further in order to maintain continuous operation and to provide for the possibility for future expansion without investing too much capital in equipment which is likely to become obsolete, it is contemplated:

(1) to increase the power of existing radio homing station;

(2) to establish additional radio homing station between terminals;

(3) to equip four aerodromes (two international, two domestic) with VHF omni-directional ranges for experimental operation as a step to further modernization;

(4) to equip four aerodromes - Shanghai, Hankow, Canton, Nanking - with instrument landing systems where bad weather conditions usually prevail.

5. Promulgation and Drafting of Civil Air Regulations.

Air traffic rules have been issued and will be put into force on August 15th, 1947. Regulations governing the application for pilot and air traffic controller liscenses and the physical standards of airmen are in print. Other regulations governing the navigation of foreign air carrier operation, the registration of aircraft, and the import and export of aircraft and aviation equipment are now being drafted.

6. Personnel Training.

A CAA Training Center will be established at Shanghai, under the direction of the Chief pilot of the CAA. Communications personnel, air traffic controller and weather observers will also be trained.

IV. CONCLUDING REMARKS:

The plan outlined above is temporary and tentative in nature. Building up Chinese Civil Aviation is a gigantic task and cannot be realized without expert advice and assistance from abroad. Even this tentative plan cannot be implemented without securing the needed ground and signal equipment from abroad. Shortage of supplies in general is precipitating a crisis in Chinese civil aviation. Both CNAC and CATC are very short of spare parts. The number of planes in service of both corporations is steadily decreasing. It is, therefore, extremely urgent that the procurement of necessary spare parts be immediately effected so as to prevent the further deterioration of the present status of Chinese civil aviation. Our present minimum requirement is to secure a certain amount of ground and signal equipment in order to ensure the safety of traffic and some spare parts to maintain the present condition of Chinese civil aviation. The realization of any large scale project requires expert advice and financial assistance from abroad.

SHIPPING AND HARBORS

(A)

SHIPPING.

I. STATUS OF SHIPPING AT OUTBREAK OF WAR.

(1) In 1937, prior to the outbreak of the war, there were 4,008 ships of all categories, with a gross tonnage of 1,286,000 tons, plying Chinese coastal and inland waters. Of these, 3,457 vessels with a gross tonnage of 576,000 tons were under Chinese registry and 551 ships with 710,000 gross tons were registered under various other national flags. The Chinese vessels operated principally on the Yangtze River and other inland waterways. Most of the coastal service and a large percentage of the Yangtze River traffic were handled by foreign ships.

(2) As shown in the following table, the average tonnage per ship of Chinese vessels was less than 170 tons, while the average tonnage per ship of foreign ships operating in Chinese waters was just under 1,300 tons:

NUMBER & TONNAGE OF SHIPS AT OUTBREAK OF WAR

Owner	Sea-going Ships		River Crafts		Total		Remarks
	Number	Gross Tons	Number	Gross Tons	Number	Gross Tons	
Chinese	124	367,383	3,333	208,617	3,457	576,000	Very few are over 3,000 tons each.
Foreign					551	710,000	
Total					4,008	1,286,000	Including all vessels of over 20 tons each

II. CONDITIONS OF CHINESE SHIPPING DURING THE WAR AND ON V-J DAY.

(1) As a result of the blockade and seizure of the China coast and harbor areas by Japanese armed forces, all sea-going vessels and some of the river steamers, under Chinese registry were lost in the early days of the war. Others were destroyed to prevent use by the enemy. With all shipyards and repair facilities lost, there was no possibility of replacement or even major repair.

(2) On V-J Day what little remained of the Chinese shipping consisted of 457 vessels of only 80,680 gross tons averaging less than 180 tons per ship. Many of these were in a poor state of repair. The following table gives details:

REMNANT OF THE CHINESE MERCHANT MARINE ON V-J DAY

Owner	Sea-going Ship Number	Sea-going Ship Gross Tons	River Craft Number	River Craft Gross Tons	Remarks
Government	None		17	23,942	
Private	None		440	56,738	
Total	None		457	80,680	Including small crafts of less than 20 tons each.

III. RESTORATION WORK SINCE V-J DAY.

(1) When Japan surrendered, there were over 100,000 gross tons of ships of various types and sizes in the liberated waters. They were taken over by the Government but most of them were found in an unserviceable state due to poor maintenance by the Japanese and to damage caused by Allied aerial bombing. A large number of the smaller crafts had little or no commercial value. Neither were there materials and yard facilities available for their rapid repair. As a result these "taken-over" vessels were of little immediate value.

(2) Shortly after the conclusion of the war, arrangements were made to procure ships abroad. Purchases were made through various agencies both by the Government and by private shipping firms. These ships were obtained mainly from the United States and Canada. In less than two years the merchant marine expanded to a total of 2,518 ships with an aggregate tonnage of 808,815 gross tons. Sizes and owners of the ships are shown in the following table:

MERCHANT SHIPS IN SERVICE BY THE MIDDLE OF 1947

Owner	Sea-going Ships Number	Sea-going Ships Gross Tons	River and Small Craft Number	River and Small Craft Gross Tons	Total Number	Total Gross Tons
Central Government	69	267,878	180	64,115	249	331,993
Local Government	104	23,650	178	11,837	282	35,477
Private	844	337,394	1,143	105,951	1,987	441,345
Total	1,017	628,922	1,501	179,893	2,518	808,815

(3) So far as the economical operation is concerned, these procured ships are either too old or of a type unsuitable for the conditions in China and are generally very expensive to maintain. Furthermore, it is very difficult to obtain spare parts for these vessels. At present, passenger and combination passenger-cargo ships are imperatively needed for both coastal and inland water services. These types of vessels are not available from existing surplus ships abroad.

IV. CONCLUDING REMARKS.

The Chinese Merchant Marine should be able to render adequate service to the Chinese coastal areas and its inland waters as well as to the South Sea area where large number of Chinese live. Since ships suitable for navigation in Chinese waters are not immediately available, it is obvious that utilization to the fullest extent of what we have at present is of the utmost importance. We plan therefore to concentrate our efforts on maintenance. Pending procurement of suitable ships, good maintenance of the existing equipment and salvage and overhaul of damaged ships during the war are absolutely essential.

The following lists give the number and tonnage of ships procured abroad from V-J Day up to June 1947.

SHIPS PURCHASED BY THE GOVERNMENT

Description	Nos.	Total Gross tons
Sea-going Vessels:		
Liberty Ship-	10	72,231.30
Leker-	16	44,076.89
N-3 Cargo Ship-	10	18,728.00
Gray Type Ship-	3	8,704.93
B-Type Ship-	7	9,460.36
Corvette-	5	7,057.22
Other-	1	3,179.41
Oil Tankers:		
Big-	4	30,569.75
Small-	18	21,965.58
Landing Crafts:		
L.S.T.-	5	16,655.20
L.S.M.-	15	12,985.05
L.C.T.-	10	2,350.00
Sea-going Tugs:		
A.T.A.	7	4,177.60
L.T.	4	1,734.24
Barges & Lighters:		
YF-3 Lighter-	9	20,057.31
YF-2 Lighter-	2	1,000.00
YC Lighter-	4	2,000.00
Oil Barge-	4	3,200.00
YR Work Lighter-	2	1,080.00
B.C.L.Concrete Lighter	1	2,651.00
Total-	137	283,801.84

SHIPS PURCHASED BY PRIVATE FIRMS

Source	Number	Total Gross Tons
Greece	3	8,337.00
Panama	16	42,437.00
United Kingdom	18	48,677.00
Australia	6	9,410.00
United States	48	102,851.00
Canada	13	19,569.00
Norway	9	19,973.00
France	1	8,139.00
	114	253,393.00

(B) HARBORS

I. CONDITION BEFORE THE WAR AND ON V-J DAY.

The history of the development of the various harbors in China before the war is so well known that it hardly requires any comment here. During the war, the Japanese occupied all of our harbors. But, except those in North China and Manchuria, little was done to improve them. Towards the later part of the war, godowns, wharves, revetments and equipment were allowed to deteriorate. Consequently, on V-J Day, all the harbors were in a deplorable condition.

II. RESTORATION WORK AFTER V-J DAY.

(I) First Phase-Planning. In the early part of 1946, a group of American technical experts were invited to make a survey of the Chinese harbors. Assisted by Chinese engineers, they made a careful study on the actual conditions and submitted recommendations concerning the necessary repair and improvement to be done. A summary of their findings is as follows:

Name	Capacity tons/yrs.		Depth below L.L.W. (in feet)	
	Original State	After Repair & Improvement	Original	After Repair & Improvement
Hulutao	1,000,000	3,000,000*	19-29	
Chinwangtao **	5,000,000		26	
Yingkow	200,000	4,000,000	15	19.5-26.5
Tsingtao	6,000,000	16,000,000	13-35	
Lien-Yuan-Kiang	700,000		16.5-19	25 (Plan 1) 19 (Plan 2)
Shanghai	32,000,000	42,000,000	30	
Foochow	800,000		2 bars 7½ -9	
Amoy	1,900,000		30	
Swatow	2,500,000		15-24	
Canton ***	3,500,000	40,000,000	11	24
Kwangchowwan	200,000	1,000,000	6-30	
Pakhoi	334,000		10	
Yamchow			12	
Hainan Island Harbours				
(1) Haikow	600,000		12	
(2) Pakseu			30	
(3) Yulin	1,000,000		30	
Total	55,764,000	110,000,000		

* 3,000,000 tons/yrs planned by the Japanese, 1,000,000 tons/yr. increase when improved.

** No development needed.

*** It is not recommended to develop Whampoa, since it would cost about U.S.$20,000,000 to make it a complete operating unit as Canton.

(2) Second Phase - It is self-evident that the rehabilitation of China's economy requires free exchange of goods between north and south China and unhampered flow of exports and imports. This presupposes the availability of good harbors. But harbor rehabilitation is usually heavy construction work requiring good engineering materials and equipment which can only be secured abroad. This involves considerable expenditure in foreign exchange. Without assistance from abroad all that we have been able to do has been confined to such repair work as could be effected with the available resources in this country. The following sums up what has been done.

(a) Hulutao. Pending the restoration of Dairen Hulutao is the most important port in Manchuria. It constitutes natural complement to Chinwangtao which, being primarily a coal port, must not be overburdened with other traffic as to interfere with the movement of this essential commodity. Early in 1946 a Government Mission visited Hulutao to study its possibility as a logistic base. This Mission recommended development of Hulutao as the main port with Chinwangtao as a forwarding or rear depot to accomodate shipments when Hulutao is frozen during the severe winter (3 to 4) months. With some improvised repair work hastily executed, Hulutao has served since last May as the main port through which all logistic movements from south China into Manchuria have been effected. This port was left by the Japanese in a desolate state. After Japanese evacuation it was occupied for a short period by the Communists who aggravated the conditions there by damaging the light towers and other essential installation. Since the taking-over by the Government continual repair works of a minor nature have been kept in constant progress. Piers I and II are under repair at present. But the port is still in a very bad condition. A large sum of money, of which a considerable percentage will be foreign exchange, will have to be spent to make this port really serviceable. But the general economical and military importance of this port seems to justify this expenditure.

(b) Tangku. Construction work of the Tangku Harbor is an undertaking left unfinished by the Japanese. Despite shortage of engineering materials and other difficulties, the construction of a navigation lock has been completed. Dredging of the channel and construction of the Pier No. I to connect the branch line of the Peiping-Mukden Railway are also in progress. The construction of the two principal breakwaters and other necessary works require, however, large quantities of imported materials and equipment and cannot be completed without assistance from abroad.

(c) Tsingtao. The repair of pier No. VI has been completed. Piers No. I, II, III, and VI have been tempor rily strengthened. The necessary materials for the repair of Pier No. V will be procured from the United Stated. Tsingtao is important both as a commercial port and as a naval base. To restore it at an early date to the prewar condition seems to be the minimum effort the Government ought to make.

(d) Shanghai. General improvement of the harbor has been carried out under the supervision of the Shanghai Harbor Board. A new temporary wharf at the terminal of the Shanghai-Nanking Railway has been partially completed. Shanghai is the most important port in China. But it has grown up without a plan. It would need very careful planning to re-made Shanghai into a modern port coordinated with all recently developed land and air communications of this country.

III. PROPOSED CONSTRUCTION AND IMPROVEMENT WORK.

Canton and Kwangchowwan are the most important harbors in South China. Canton is the terminal of the Canton and Hankow Railroad. Kwangchowwan is a good natural harbor and will be connected one day by railway from Fort Bayard to Linchow. It is extremely urgent that construction work on these two harbors be taken up at an early date.

(V) TELECOMMUNICATIONS AND POSTAL SERVICE

(A) TELECOMMUNICATIONS

I. CONDITION BEFORE THE WAR

(1) Prior to the Sino-Japanese war of 1937, all telecommunication facilities were concentrated in the coastal provinces, with the International Radio Station situated at Shanghai. Only a small number of telegraph lines and radio stations were scattered in the South-West regions.

(2) There were in China 40,543 loop kilometers of toll telephone lines, 128,105 wire kilometers of telegraph lines, 76,232 lines of local telephones, and 171 radio stations. (See Tele-Com. Map No.1 & 2)

II. CONDITION ON V-J DAY

(1) a. In the South-West and North-West districts we experienced great difficulties in telecommunication during the first phase of the war. Later on, as a result of persistent effort made by the Chinese Government, under extreme financial difficulties and despite lack of supplies, 52,678 loop kilometers of toll telephone lines, 32,102 wire kilometers of telegraph lines, 7,978 lines of local telephones, and 234 radio stations were constructed. This network made it possible to maintain direct telephone and telegraph communications between all principal cities in Free China throughout the war.

b. The International Radio Station was re-established at Chungking, with branch stations at Chengtu and Kunming, enabling China to keep direct and constant contact with all her allies.

(2) On V-J Day, there were 55,536 loop kilometers of toll telephone lines, 100,991 kilometers of telegraph lines, 10,000 lines of local telephones, and 285 radio stations. Most of these installations were located in Free China. (See Tele-Com. Map No. 3 & 4)

(3) It is obvious that all these telecommunication facilities were expanded chiefly to meet military requirements. It was in the field of military intelligence and particularly in the field of air-raid defense that the telecommunication network made its most notable contribution to the war.

III. COMMUNIST DESTRUCTION

(1) From V-J Day to June 1947, the Communist destruction of the telephone and telegraph lines at various places in the country amounted to 1,051 times, totalling a length of 10,932 kilometers. (See Tele-Com. Map No. 5)

IV. GOVERNMENT RESTORATION AND PRESENT CONDITION

(1) With the view to restoring speedily the telecommunication between the liberated areas and Free China, radio stations were set up immediately after V-J Day at all the key points in the liberated areas. The International Radio Station at Shanghai was also quickly restored with a new branch station in Nanking.

(2) The second step taken was to rebuild all the trunk toll telephone and telegraph lines as well as the important subsidiary lines.

(3) The following figures, embodying the results of almost two years of patient work, give a general idea of the present status of China's telecommunications and with the single exception of the mileage of telegraph lines, all the figures exceed those of the pre-war days:

Toll telephone lines	———	113,024 loop km.
Iron telegraph lines	———	115,777 wire km.
Local telephones	———	161,690 lines
Radio station	———	673 sets

(See Tele-Com. Map No. 6 & 7)

(4) With regard to the actual amount of traffic great improvement has been made. The latest monthly traffic of domestic telegrams amounts to 44,600,000 words while the pre-war figure was only 20,000,000. The ratio of the commercial and private traffic to the government and military is 73% to 27% whereas during the war, the ratio was 25% to 75%. The latest monthly traffic of international telegrams is 1,700,000 words as against 980,000 in June, 1937. At present nearly 50% of the telegrams are despatched to the United States.

(5) Substantial progress has also been made in increasing the speed of telegraphic transmission. The time required for delivery of all classes and types of messages has also considerably improved. International radio traffic under normal conditions are cleared very expeditously. For example, a message to the United States only takes one to two hours to reach its destination.

(6) We have encountered, and are still encountering, innumerable difficulties in our rehabilitation and reconstruction work. The main cause is to be sought in our inability to provide the necessary materials. China is at present not in a position to manufacture telecommunication equipment, nor has she sufficient foreign exchange to effect the necessary procurement. The toll telephone and telegraph network is merely a skeleton of trunk lines, consisting mostly of one single pair or two pairs of wires, used both for short and long distance hauls. The capacity of these lines to clear the traffic falls far short of the ever increasing demands of the public. Most of the telegraph instruments used throughout the country are either the obsolescent old-fashioned Wheatstone instruments or the obsolete Morse inkwriters and sounders. No other instruments of higher efficiency are available to replace them. The Ministry of Communication owns and operates only 160,000 lines of local telephones, averaging one telephone to every three thousand persons. This is obviously inadequate to meet the present demand of the public.

V. PLAN FOR THE NEAR FUTURE

(1) Judging on the basis of the good record of the Chinese telecommunication service, we are confident that China can build up and operate a modern telecommunication system, if the necessary materials and equipment can be obtained.

(2) Time is not yet opportune for any large scale permanent reconstruction in North China and Manchuria. Only temporary or semi-permanent work can be done to meet the military requirements. As we have been facing almost daily Communist destruction in these two areas, it is absolutely essential to pile up a reserve pool of maintance materials and spare parts to meet all emergencies. In this connection, the restoration of two coastal submarine cables to link up Shanghai with Tsingtao, Tientsin, and Hulutao should be of great help. The value of these cable lines to ensure telegraphic communication between South China and North China is obvious.

(3) So far as the permanent reconstruction work is concerned, our attention and energy must be directed mainly to the expansion and improvement of the telecommunication facilities in Central and South China. Our minimum requirement will be the realization of a plan as worked out by the Ministry of Communications with the cooperation of the UNRRA experts. This plan comprises the following main items:

Copper wire	90,540 loop kilometers
Local telephones	142,600 lines
Radio transmitters	256 sets
Coastal submarine cable	1,540 nautical miles
12-channel carrier telephone equipment	6 systems
3-channel carrier telephone equipment	64 systems
1-channel carrier telephone equipment	52 systems
18-channel carrier telegraph equipment	20 systems
4-channel carrier telegraph equipment	22 systems

(See Tele-Com. Map No. 6 & Table No. 1, 2 & 3)

It was estimated that the material required to implement the above plan would cost U.S. $30,000,000. (Not including coastal submarine cable.), of which UNRRA was only able to dedicate U.S. $3,296,000.

(B) POSTAL SERVICE

1. Postal progress had been seriously hampered during the eight long years of war or resistance. Immediately after V-J Day, the task of nation-wide restoration and modernization of the Postal Service was tackled. At the close of June 1947, with the exception of parcel service, an all-round increase was made in the number of post offices functioning, the length of mail lines under operation, and the volume of mail matter handled as the accompanying Postal Chart No.1 will show.

2. Realizing the necessity of accelerating mail transmission, an energetic effort was made towards this end, as a result, the time required for letters exchanged between Nanking, the capital, and the principal cities throughout the country has been greatly shortened. This gain of time was made possible through the extensive utilization of air transport. For some time now, all letters, whether prepaid with air mail postage or not, have been transported by airplanes. This additional expense has been borne by the Post Office as a service to the Chinese people. The accompanying Postal Chart No. 2 shows the time taken by letters exchanged between Nanking and principal cities in the country at present in comparison with the pre-war time. This may be illustrated by the time taken for a letter from Nanking to reach Aweiyang. Before the war, it took 22 to 31 days and now it takes only 4 to 6 days. With particular regard to mail transmission between Nanking and Shanghai, marked progress has been made. Letters dropped in any of the designated express pillar-boxes at one end before 10 p.m. can be delivered early next morning. Likewise, those posted in the early morning can also be delivered on the same day.

(3) Synchronizing with the acceleration of mail transportation, more facilities to the public in posting their mail have been provided. As shortage of housing accommodations renders the opening of new branch post offices in large cities extremely difficult, if not impossible, we have to resort to other means, such as Postal Kiosks, Mobile Post Offices on trucks, Train and Steamer Post Offices. These facilities have already been extended to many large cities.

(4) Having achieved some results in the improvement of Postal Service in the principal cities throughout the country, we are now devoting our attention to improve the service in inland and border provinces. A long-distance postal truck line has been established in the northwest, linking up Tihwa, the provincial capital of Sinkiang. In view of the very large number of offices functioning inland, the task before us is an extremely difficult one.

(5) We have a long-range plan for reconstruction, but our efforts have been, and will be, hampered by the disturbances created by the Communists. At present, many postal establishments in the north and the northeast are occupied by the Communists and many postal lines have been interrupted. As shown in the accompanying Postal Chart No. 3, the areas shaded are occupied by the Communists and postal operations there are entirely suspended. No improvement can be expected in this region under the prevailing circumstances.

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